

IUCN Directory of NEOTROPICAL PROTECTED AREAS



**Commission on National
Parks and Protected Areas**

**International Union for
Conservation of Nature
and Natural Resources**



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**IUCN Directory of Neotropical
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IUCN Commission on National Parks
and Protected Areas (CNPPA)

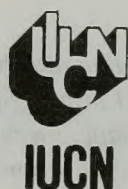


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IUCN Directory of Neotropical Protected Areas

IUCN Commission on National Parks
and Protected Areas (CNPPA)



Published for IUCN

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FOREWORD

The publication of the *World Conservation Strategy* in March 1980 marked an important turning point in the history of protected areas. This document defined conservation as 'the management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations.' Living resource conservation under this definition is seen to have three specific objectives: to maintain essential ecological processes and life-support systems; to preserve genetic diversity; and to ensure that utilization of species and ecosystems is sustainable. Conservation therefore is expected to make important contributions to social and economic development, and protected areas have a prominent role to play in this process.

Now, more than ever before, the world needs protected areas which are designed, planned, and managed explicitly to bring benefits to people. And while the *World Conservation Strategy* contains what may appear to be a new approach, in fact the social and economic benefits of protected areas have long been recognized in the Neotropical Realm. National parks protect the water supply of Rio de Janeiro, provide the water to run the major industries of Venezuela, provide important sources of foreign exchange in Central America and the Caribbean, and provide a livelihood for many people in the Amazonian region of Brazil.

The *IUCN Directory of Neotropical Protected Areas*, the first in IUCN's new series of protected area directories, contains details on some 90 per cent of the protected areas of the Neotropical Realm, providing information on the very significant efforts that are being made by the nations of Latin America and the Caribbean in designing, planning, and managing a wide variety of protected areas for the benefit of their peoples.

The Directory is a product of the Protected Area Data Unit (PADU), part of IUCN's Conservation Monitoring Centre in the UK. Working in close cooperation with the United Nations Environment Programme and the World Wildlife Fund, it is expected that additional directories will be produced at the rate of approximately one per year, with later editions containing increasingly more complete and useful information.

All of the data is on the CMC computer, which will soon be able to provide information in a variety of configurations to scientists, national park planners, and development agencies. A development assistance organization, for example, may wish to know if the upstream watershed for a potential hydroelectric site is protected by a national park, or require detailed information to allow choices among various alternatives for an agricultural development project; agricultural researchers may need to know where the wild ancestors of domestic rubber or potatoes might be found in a protected area; and scientists may be interested in knowing which protected areas in the Amazonian rainforest contain armadillos which might be of use in leprosy research.

Through making such information readily available in a useful form, IUCN will be able to help ensure that development decisions will lead to a sustainable improvement in the standard of living of all people, and that protected areas will make their important contributions to society.

*International Union for Conservation
of Nature and Natural Resources*

Lee M. Talbot
Director General

INTRODUCTION

THE RAPID CHANGES in economic and social development which have taken place in recent years have led to a number of new approaches to the protection of plant and animal species. In virtually all nations, the urgency to link natural area preservation to development through research, base-line monitoring, environmental assessment, genetic material maintenance, watershed management, environmental education, and the like, has led to a shift in management of natural areas; national parks are as important as ever, but there are now a number of additional categories of protected areas which are managed with different objectives for bringing benefits to society. These areas, many of which are include in the *IUCN Directory of Neotropical Protected Areas*, include Strict Nature Reserves, Managed Nature Reserves, Natural Monuments, Cultural Landscapes, Biosphere Reserves, and several others.

With greatly increased responsibilities for helping ensure that social and economic development meets the real needs of society, protected areas are now receiving a significantly greater amount of support from governments, international development agencies, and local people. No longer just playgrounds for vacationers and means for conserving natural heritage, protected areas have become an inseparable part of the modern human ecosystem.

The *IUCN Directory of Neotropical Protected Areas* is the first in a series of directories which will document the protected areas of the world and the increasingly important role they are playing in human society. Building upon the foundations of the *United Nations List of National Parks and Equivalent Reserves* (first published in 1961 and up-dated periodically since then) and the *World Directory of National Parks and Other Protected Areas* (1977), the new series will bring together basic information on virtually all of the national parks and other types of protected areas from around the world. The objectives of this series include:

- **Establishing the basis of a monitoring system which will help ensure that the specific objectives of each protected area are attained and continue to be attained;
- **Providing the basis for establishing priorities for future action;
- **Promoting the effective management of protected areas through making basic information widely available;
- **Providing a working tool for protected area managers, facilitating comparison between areas;
- **Stimulating increased interest in protected areas on the part of students, scientists, researchers, land-use planners, government officials, and the general public.

The *Neotropical Directory* was compiled by members of IUCN's Commission on National Parks and Protected Areas (CNPPA) from the countries involved. Preparation of the sheets was coordinated by: Ricardo Luti for Argentina; Manuel Rios for Bolivia; Maria Teresa Jorge Padua and Paulo Nogueira Neto for Brazil; Allen Putney, D.G. Campbell, Bal Ramdial, and Ken Thelen for the Caribbean; Craig MacFarland for Central America; Juan Oltremari for Chile; Heliodoro Sanchez Paez for Colombia; S. Cuenas Salas and J. Reyes Rodriguez for Mexico; Marc Dourojeanni, Hilario Moreno, and Hernan Torres for Paraguay; Marc Dourojeanni for Peru; Rob Milne for the USA; and Cecilia de Blohm and Pedro Salinas for Venezuela. Each of these coordinators has relied on a network of individuals, too numerous to mention here, working in the field and in national park service headquarters.

The draft sheets were presented at the 18th Working Session of the Commission, held in Lima, Peru, from 21 to 28 June 1981. The sheets were discussed and revised, and additional sheets were solicited to make coverage as complete as possible. Information which had been collected by UNESCO for its *Man and the Biosphere* programme was also used. The sheets were then edited by Jeremy Harrison, Research Officer at IUCN's Protected Areas Data Unit, and his assistant Eileen Egginton; the overall flow of the data collection programme was controlled by Kenton Miller, Chairman of CNPPA, and administered by Jeffrey A. McNeely, Executive Officer of CNPPA.

THE PROTECTED AREAS DATA UNIT

CNPPA has been collecting information on protected areas for more than 20 years, ever since the 1959 United Nations resolution requested IUCN to form and maintain the *United Nations List of National Parks and Equivalent Reserves*.

Table 1. Number of protected areas and total area protected in each of the 47 Neotropical Provinces of Udvardy (1975)

Name of Province		Number of areas	Total Area (hectares)
1	Campechean	3	62,744
2	Panamanian	6	660,902
3	Colombian Coastal	6	860,000
4	Guyanese	25	2,152,722
5	Amazonian	16	13,894,181
6	Madeiran	1	268,150
7	Serra do Mar	6	180,468
8	Brazilian Rain Forest	12	365,593
9	Brazilian Planalto	1	11,307
10	Valdivian Forest	5	1,685,995
11	Chilean <i>Nothofagus</i>	4	216,014
12	Everglades	14	774,456
13	Sinaloan	4	122,994
14	Guerreran	3	17,371
15	Yucatecan	2	106,970
16	Central American	22	880,912
17	Venezuelan Dry Forest	27	1,125,798
18	Venezuelan Deciduous Forest	12	849,903
19	Equadorian Dry Forest	3	161,300
20	Caatinga	3	236,100
21	Gran Chaco	6	1,294,000
22	Chilean <i>Araucaria</i> Forest	6	153,595
23	Chilean Sclerophyll	3	34,054
24	Pacific Desert	2	360,070
25	Monte	8	1,544,491
26	Patagonian	5	99,793
27	Llanos	3	1,207,000
28	Campos Limpos	3	3,192,000
29	Babacu	1	155,000
30	Campos Cerrados	12	2,518,529
31	Argentinian Pampas		0
32	Uruguayan Pampas	5	224,950
33	Northern Andean	9	913,288
34	Colombian Montane	8	1,397,050
35	Yungas	6	558,092
36	Puna	15	1,985,530
37	Southern Andean	18	3,369,684
38	Bahamas-Bermudan	4	122,540
39	Cuban	4	24,305
40	Greater Antillean	7	220,230
41	Lesser Antillean	15	19,574
42	Revilla Gigedo Island		0
43	Cocos Island	1	3,200
44	Galapagos Islands	1	691,200
45	Fernando de Noronja Island	1	36,249
46	South Trinidade Island		0
47	Lake Titicaca	1	36,180
TOTAL		319	44,794,484

In 1979 CNPPA began to expand its information-gathering role by developing a more organized system of data collection. Coordinators for the various biogeographic provinces were appointed by CNPPA to compile detailed information about protected areas. At meetings in Costa Rica, Scotland, Cameroon, Peru, New Zealand and the USA and Canada, the coordinators presented data sheets on the protected areas in their parts of the world. Information on about three-quarters of the areas on the *UN List* has now been gathered, although the completeness of this information still varies widely.

CNPPA also collects other information such as management plans, published papers, maps, species lists, brochures and so on, and details of the conservation and protected area systems within each country. To ensure that the information held is kept up-to-date, CNPPA is developing a three-year review and publication cycle.

Such an increase in available information would be of limited use without an improved system for handling the data, so in May 1981 CNPPA (in cooperation with the United Nations Environment Programme and the US Nature Conservancy) inaugurated the Protected Areas Data Unit (PADU). This unit, which is part of IUCN's Conservation Monitoring Centre (CMC), is located at the Royal Botanic Gardens, Kew, England, where the CMC computer has been installed; the CMC operates within the auspices of the UNEP Global Environment Monitoring System (GEMS). PADU is responsible for the day-to-day collection of information on protected areas, and for filing that information both manually and on the computer in such a way that it can be retrieved on demand, in the most appropriate format.

By carefully assessing the coverage by protected areas of each biogeographical province on land or at sea, CNPPA will be able to identify gaps or weaknesses in the worldwide system of reserves; it will then be much easier to chart the development of new areas year by year, and to focus attention where it is most required. Table 1 gives an analysis of the current position in the Neotropical Realm, summarising the protected areas by biogeographical province (see below). By comparing these figures with Map 1, it is possible to estimate how well covered each of the provinces are by protected areas. If protected area cover can also be compared with information on centres of diversity, endemism or wild ancestors of domestic plants, it may bring to light previously hidden gaps in the system.

One of the main advantages of using computerised data files to hold the basic information is the ease with which these files can be manipulated. Data items can be sorted and selected using any character or group of characters within the file. For example, lists can be produced of protected areas of over 100,000 hectares within the Tropical Forest Biome in Latin America, or all protected areas established between 1975 and 1980. Information in the files can also be quickly summarised for publication; volumes could be produced, for example, on protected areas containing tropical rain forest around the world, the protected areas of Brazil, or all the protected areas containing jaguars.

APPLICATIONS OF THE MONITORING SYSTEM

It is clear that each individual country has far more information on its own protected areas than could ever be handled by the unit, or published in the IUCN directories. Further, most countries have the capacity to establish computer systems and to maintain their own information in ways that meet their own needs. There are, however, a number of reasons for having an international 'macro-level' information system:

- **Many international development agencies, if provided with quick and large-scale overviews of certain protected areas questions, would be able to design their projects to enhance sustainable development and to avoid adversely affecting particularly sensitive areas.
- **IUCN, the World Wildlife Fund, and other international conservation agencies need a basis for determining high priority areas for allocation of scarce international conservation funds; such investments must be made on a rational basis, which is only possible when broad comparisons can be made.
- **UNESCO's *Man and the Biosphere* Programme and the *World Heritage Convention* require global information, the former in order to ensure that representative areas of all biogeographic provinces are established as biosphere reserves, the latter in order to ensure that sites nominated to the *World Heritage List* are of truly 'outstanding universal significance'.
- **The international effort to promote protected areas requires a centralized source of information for publications, requests from journalists, and other promotional and publicity uses.
- **Scientists often need to make comparisons over the entire range of habitats or species ranges, requiring an international overview.
- **Plant breeders need to know where wild ancestors of domestic agricultural crops can be found in protected areas, in order to locate sources of genetic diversity for improving crop breeds.
- **Governments need to know what is being done in the field of protected areas management in other countries, in order to enhance their own efforts and to avoid repeating mistakes.

PADU will produce nothing that could not have been produced by governments or members of the

CNPPA, given sufficient time and energy; the unit will provide only what is fed into it, but it will be able to produce the data very quickly and in many different configurations. It will not replace any of the human element in protected area management, but it will allow managers, development planners, conservationists, and scientists to be more efficient by providing the data needed, when it is needed, and in the form required.

Most important, collecting and presenting protected areas information in a professional and competent manner demonstrates to governments, development agencies, and individuals around the world that national parks and reserves are valuable land-use tools for managing areas which should, for various reasons, be kept in a natural or semi-natural state. Making protected areas data more accessible will help to ensure that the reserves can play their proper role in the process of socio-economic development.

WHAT THE DATA SHEETS CONTAIN

EACH OF THE contributors to this volume was asked to complete a standard form which contains the following data categories:

NAME OF THE PROTECTED AREA: This is the name of the area given by the management authority, in the language of the data sheet (either English or Spanish).

MANAGEMENT CATEGORY: This is the type of protected area, following the scheme of the IUCN (1978) paper, *Categories, objectives, and criteria for protected areas*. This paper divides the 140 or so names that have been provided for various sorts of protected area into 10 categories, as follows:

Category I - Scientific Reserves/Strict Nature Reserves

These areas possess some outstanding ecosystems, features and/or species of flora and fauna of national scientific importance; they are generally closed to public access, recreation and tourism. They often contain fragile ecosystems or life forms, areas of important biological or geological diversity, or are of particular importance to the conservation of genetic resources. Size is determined by the area required to ensure the integrity of the area to accomplish the scientific management objective and provide for its protection.

Natural processes are allowed to take place in the absence of any direct human interference. These processes may include natural acts that alter the ecological system or physiographic feature at any given time, such as naturally occurring fires, natural succession, insect or disease outbreaks, storms, earthquakes and the like, but necessarily exclude man-made disturbances. The educational function of the site is to serve as a resource for studying and obtaining scientific knowledge.

Land-use control and ownership should in most cases be by central government. Exceptions may be made where adequate safeguards and controls relating to long-term protection is ensured and where the central government concurs.

Category II - National Parks/Provincial Parks

A national park is a relatively large area: (1) where one or several ecosystems are not materially altered by human exploitation and occupation, where plant and animal species, geomorphological sites and habitats are of special scientific, educational and recreational interest or which contains a natural landscape of great beauty; (2) where the highest competent authority of the country has taken steps to prevent or eliminate as soon as possible exploitation or occupation in the whole area and to enforce effectively the respect of ecological, geomorphological or aesthetic features which have led to its establishment; and (3) where visitors are allowed to enter, under special conditions, for inspirational, educational, cultural and recreational purposes. Governments are accordingly requested not to designate as 'national park':

- (1) A scientific reserve which can be entered only by special permission (Category I Strict Nature Reserve).
- (2) A natural reserve managed by a private institution or a lower authority without some type of recognition and control by the highest competent authority of the country.
- (3) A 'special reserve' as defined in the African Convention on the Conservation of Nature and Natural Resources of 1968 (Categories III, IV, fauna or flora reserve, game reserve, bird sanctuary, geological or forest reserve, etc).

- (4) An inhabited and exploited area where landscape planning and measures taken for the development of tourism have led to the setting up of 'recreation areas' where industrialization and urbanization are controlled and where public outdoor recreation takes priority over the conservation of ecosystems (Categories V, VI, VII, and VIII, parc naturel régional, nature park, Naturpark, etc.). Areas of this description which may have been established as 'national parks' should be redesignated in due course.

In general, exploitation of natural resources must be prohibited in an area which is to be considered a national park. Exploitation, in this sense, is considered to include the removal of mineral resources, timber and other vegetation, and animal life, or the development of dams or other structures for irrigation or hydroelectric power. Prohibition should extend to agricultural and pastoral activities, hunting, fishing, lumbering, mining, public works construction (transportation, communications, power, etc), and residential, commercial or industrial occupation.

Certain exceptions to this general rule may be permitted:

- (1) Some of the activities included in the general prohibition must be permitted in those national parks and related reserves in which zones have been established to protect a cultural heritage (e.g. managed agricultural or pastoral landscape zones; villages, towns or urbanized areas of historical or archaeological interest, etc), since these activities form part of the heritage to be protected.
- (2) Sport fishing is regarded in the same category as sport hunting and should normally be excluded from national parks. In wilderness areas the continuance of sport fishing, where this has been a traditional practice, may be acceptable providing adequate fauna exist in other areas. Sport fishing may be accepted in zones developed for intensive recreational or touristic use.

It is recognized that within the boundaries of certain national parks there are existing villages, towns, communication networks, and the on-going activities connected with them. Provided that these areas do not occupy a significant part of the land and are *de facto* zoned and so arranged that they do not disturb the effective protection of the remaining area, they can be included in a national park.

Similar considerations apply in regard to private rights which existed before the reserve was created, such as residential rights or rights to practise agricultural, pastoral or mining activities, always provided that these rights are confined to a small part of the area. They should not be permanent and their redemption or termination should be anticipated in the long term.

The general requirement against exploitation must be rigidly enforced.

Management activities. Not to be considered under the category of exploitation are those activities necessary for the administration and management of the protected area, or for the reasonable development of a national park or provincial park as a site for public outdoor recreation or tourism. Among these activities are the following:

- (1) Since public access is allowed in National Parks, the construction and maintenance of a road network, the setting aside of areas for public accommodation with consequent cultivation of gardens, the construction of recreation facilities, and related services must be permitted. However, accommodation, recreation facilities and the like should not be scattered throughout the protected area, and the area they occupy should be restricted to a minimum. They should be located in areas zoned for this purpose or preferably located outside the park.
- (1) The public works necessary for the actual administration and management of the protected area, including staff housing, offices, access roads, gardens and so on, are permitted but should also be restricted to a minimum.
- (1) Management activities for the purpose of maintaining the desired flora or fauna are an essential ingredient in the conservation of protected areas in the managed natural zones and nature reserves and are permitted in them. These may include the removal of animals by shooting or capturing to maintain population levels, the removal of undesirable vegetation, and the use of controlled burning or grazing to maintain particular plant communities.

Zoning: Areas to be designated as national parks should include areas here designated as 'Category I strict natural zones' and 'Category IV managed natural zones'. In addition, they could appropriately contain areas of the kind here placed in 'Category VII protected anthropological zones' or 'protected historical' or 'archaeological zones'. To be considered as national parks, however, they must be available for public visitation. This use could be combined with the primary function of nature conservation through a system of zoning. In this, one zone would be established in which roads or other access ways may be constructed, buildings or other structures to accommodate tourism and park administrative functions may be located, and in which appropriate recreational facilities may be placed. This special

tourism/administrative zone would not be one designated primarily for nature conservation, but would be so delimited and located as to create minimum interference with the nature conservation function of the park. National parks can also satisfy the public visitation function by establishment of wilderness areas over all or part of the national park, thus providing for limited tourism of a special kind.

To qualify as a national park, in the IUCN sense, an area may consist of various combinations of zones, as follows: Wilderness zone only; Wilderness zone combined with strict natural zone, managed natural zone or both; any or all of the above zones combined with a tourist/administrative zone; any or all of the above zones combined with one or more zones classified as anthropological, archaeological or historical.

Category III - Natural Monuments/Natural Landmarks

This category normally contains one or several specific natural features of outstanding national significance such as geological formation, a unique natural site, animal or plant species or habitat which, because of uniqueness or rarity, may be threatened and should be protected. The specific feature to be protected ideally has little or no evidence of man's activities. These features are not of the size nor is there a diversity of features or representative ecosystems which would justify the area's inclusion as a national park. These areas have particular potential for public education and appreciation. Size is not a significant factor; the area should only be large enough to protect the integrity of the site.

Although Category III areas may have recreational and touristic value, they should be managed in such a way that they remain relatively free from human disturbance. These areas may be owned and managed by either central or other government agencies or non-profit trusts or corporations, as long as there is assurance that they will be managed to protect their inherent features for the long term.

Category IV - Nature Conservation Reserves/Managed Nature Reserves/Wildlife Sanctuaries

A Category IV area is desirable when protection of specific sites or habitats is essential to the continued existence or well-being of individual biotic species, or resident or migratory fauna of national or global significance.

Although a variety of protected areas fall within this category, each would have as its primary purpose the protection of nature, and not the production of harvestable, renewable resources, although this may play a role in the management of a particular area. The size of the area or, in certain instances, seasons in which special management is necessary, will be dependent upon the habitat requirement or specific characteristics of the species to be protected. These need not require vast areas but could be relatively small, consisting of nesting areas, marshes, or lakes, estuaries, forest, or grassland habitats.

The area may require habitat manipulation to provide optimum conditions for the species, vegetative community, or feature according to individual circumstances. For example, a particular grassland or heath community may be protected and perpetuated through a limited amount of livestock grazing. A marsh for wintering waterfowl may require continual removal of excess reeds and supplementary planting of waterfowl food, whereas a reserve for an endangered animal may need protection against predators. These areas may be developed in limited areas for public education and appreciation of the work of wildlife management.

Ownership may be by the central government or, with adequate safeguards and controls in which long-term protection is ensured, by lower levels of government, non-profit trusts or corporations, or private individuals or groups.

Category V - Protected Landscapes

The range of areas that fall within this category is necessarily broad because of the wide variety of semi-natural and cultural landscapes that occur within various nations. This may be reflected in two types of areas: those whose landscapes possess special aesthetic qualities, which are a result of the interaction of man and land, and those that are primarily natural areas managed intensively by man for recreational and touristic uses.

In the first case, these landscapes may demonstrate certain cultural manifestations such as: customs, beliefs, social organization, or material traits as reflected in land-use patterns. These landscapes are characterized by either scenically attractive or aesthetically unique patterns of human settlement. Traditional land-use practices associated with agriculture, grazing, and fishing would be dominant. The size of the area would be large enough to ensure the integrity of the landscape pattern.

In the latter case, natural or scenic areas found along coastlines and lake shores, in hilly or mountainous terrain, along the shores of rivers, or inland, adjacent to important tourist highways or population centres, and offering scenic views and climatic variation, are often included. Many will have the physical qualities and potential to be developed for a variety of outdoor recreational uses with national significance.

In some cases the land would be privately held and the use of either central or delegated planning control would likely be necessary to assist in the perpetuation of both the land use and life style. Means of subsidization, or other government assistance, might be required for external renovations or construction to disguise improvements in the standard of living while recognizing the dynamics of evolution of the land and its use. Efforts would be made to maintain the quality of landscape through appropriate management practices. In other instances the areas are established and managed under public ownership in perpetuity.

Category VI - Resource Reserves (Interim Conservation Unit)

Category VI areas will normally comprise extensive and relatively isolated and uninhabited areas having difficult access, or regions that are lightly populated yet may be under considerable pressure for colonization and greater utilization. In many cases, there has been little study or evaluation of these areas, and the consequence of converting these lands to agriculture, mineral or timber extraction, or the construction of roads, etc. is unclear. Similarly, use of the resources may not be appropriate because of the lack of technology, human or financial resource restrictions or alternate national priorities. Consequently, natural, social, and economic values are not sufficiently identified to permit the area to be managed for specific objectives or to justify its conversion to other land uses. Restricted access as implied so areas will normally require control, depending upon the pressures to enter and utilize the area. Some lands may be government-owned while others may be owned or administered by public corporations.

Maintenance of existing conditions to allow for studies as to the potential use for the designated areas is a prerequisite. Protection, studies, and planning are envisaged as the major activities while under this short-term designation. No exploitation should occur, with the exception of use of resources by indigenous inhabitants. There is an acceptance of ongoing eco-sensitive activities.

Category VII - Anthropological Reserves/Natural Biotic Areas

Category VII areas are characterized by natural areas where the influence or technology of modern man has not significantly interfered with or been absorbed by the traditional ways of life of the inhabitants. These areas may be remote and isolated and their inaccessibility may be maintained for a considerable period of time. The societies are considered relatively unique and may be of particular significance to the maintenance of genetic diversity and/or for research into the cultural evolution of man. These are predominantly natural areas of which man is an integral component. There is a strong dependence of man upon the natural environment for food, shelter, and other basic material to sustain life. Extensive cultivation or other major modifications to the vegetation and animal life are not permitted.

Category VIII - Multiple Use Management Areas/Managed Resource Areas

A large area, containing considerable territory suitable for production of wood products, water, pasture, wildlife, and outdoor recreation. Parts of the area may be settled and may have been altered by man. Generally, these forest or other wildland areas do not possess nationally unique or exceptional natural features.

Planning to ensure the area is managed on a sustained yield basis would be a prerequisite. Land ownership would be under government control. Through proper zoning, significant areas could be given specific additional protection. For instance, the establishment of wilderness-type areas is consistent with the purpose of these areas as would be setting aside nature reserves. Multiple use, in the context of Category VIII, is considered to be the management of all renewable surface resources, utilized in some combination to best meet the needs of the country. The major premise in the management of these lands is that they will be managed to maintain the overall productivity of the land and its resources in perpetuity.

Category IX - Biosphere Reserves

This category has been created by UNESCO in order to help involve research, education, and training in protected area management, and to expand the science of protected area management far beyond the

traditional protected area into the countryside. Each biosphere reserve will include one or more of the following:

- (a) representative examples of natural biomes;
- (b) unique communities or areas with unusual natural features of exceptional interest;
- (c) examples of harmonious landscapes resulting from traditional patterns of land use; and
- (d) examples of modified or degraded ecosystems capable of being restored to more natural conditions.

A biosphere reserve must have adequate long-term legal protection. Each biosphere reserve will be large enough to be an effective conservation unit, and to accommodate different uses without conflict. Each reserve must be approved by the *Man and the Biosphere* International Coordinating Council before it can receive designation as a biosphere reserve.

Each biosphere reserve will be zoned to provide direction as to its management. Four zones may be delineated as follows: (a) Natural or Core Zone; (b) Manipulative or Buffer Zone; (c) Reclamation or Restoration Zone; and (d) Stable Cultural Zone.

Category X - World Heritage Sites (Natural)

Sites listed on the *World Heritage List* can only be nominated by a country which is a Party to the World Heritage Convention, and include only areas of 'outstanding universal value.' The secretariat of the World Heritage Convention is provided by UNESCO; nominated sites are screened by IUCN in relation to the criteria established by the World Heritage Committee.

According to the criteria established by the World Heritage Committee, natural properties to be considered for inclusion on the List must:

- (i) be outstanding examples representing the major stages of the earth's evolutionary history;
- (ii) be outstanding examples representing significant ongoing geological processes, biological evolution and man's interaction with his natural environment;
- (iii) contain unique, rare or superlative natural phenomena, formations or features or areas of exceptional natural beauty;
- (iv) be habitats where populations of rare or endangered species of plants and animals still survive. Nominations based solely on this criterion must ensure that critical elements of a species habitat are considered throughout the range required for survival of the species.

It should be realized that individual sites may not possess the most spectacular or outstanding single example of the above, but when the sites are viewed in a broader perspective with a complex of many surrounding features of significance, the entire area may qualify to demonstrate an array of features of global significance. All areas must also meet the criteria of 'integrity'.

BIOGEOGRAPHIC PROVINCE: The Neotropical Realm covers all of South America, the Caribbean, Central America, Tropical Mexico, and the southern tip of Florida. The realm is further divided into *Provinces*, defined by significant differences in flora, fauna, and vegetation structure. These provinces are assigned geographic, ecological, or historically established names as appropriate; the provinces are presented on Map 1. Each of the provinces is characterized by one of the world's 12 *Biomes*, major regional ecological communities of plants and animals extending over a large natural area.

Based on this system, each of the 47 Neotropical Provinces is given a three-number code, with the first number corresponding to the realm, the second to the province, and the third to the biome; 8.3.1, for example, is Tropical Humid Forest (biome 1) in the Colombian coastal Rainforest Province (province 3) in the Neotropical Realm (Realm 8). This code allows each protected area to be assigned a biogeographic context, and facilitates comparison of data on biomes, provinces, and realms.

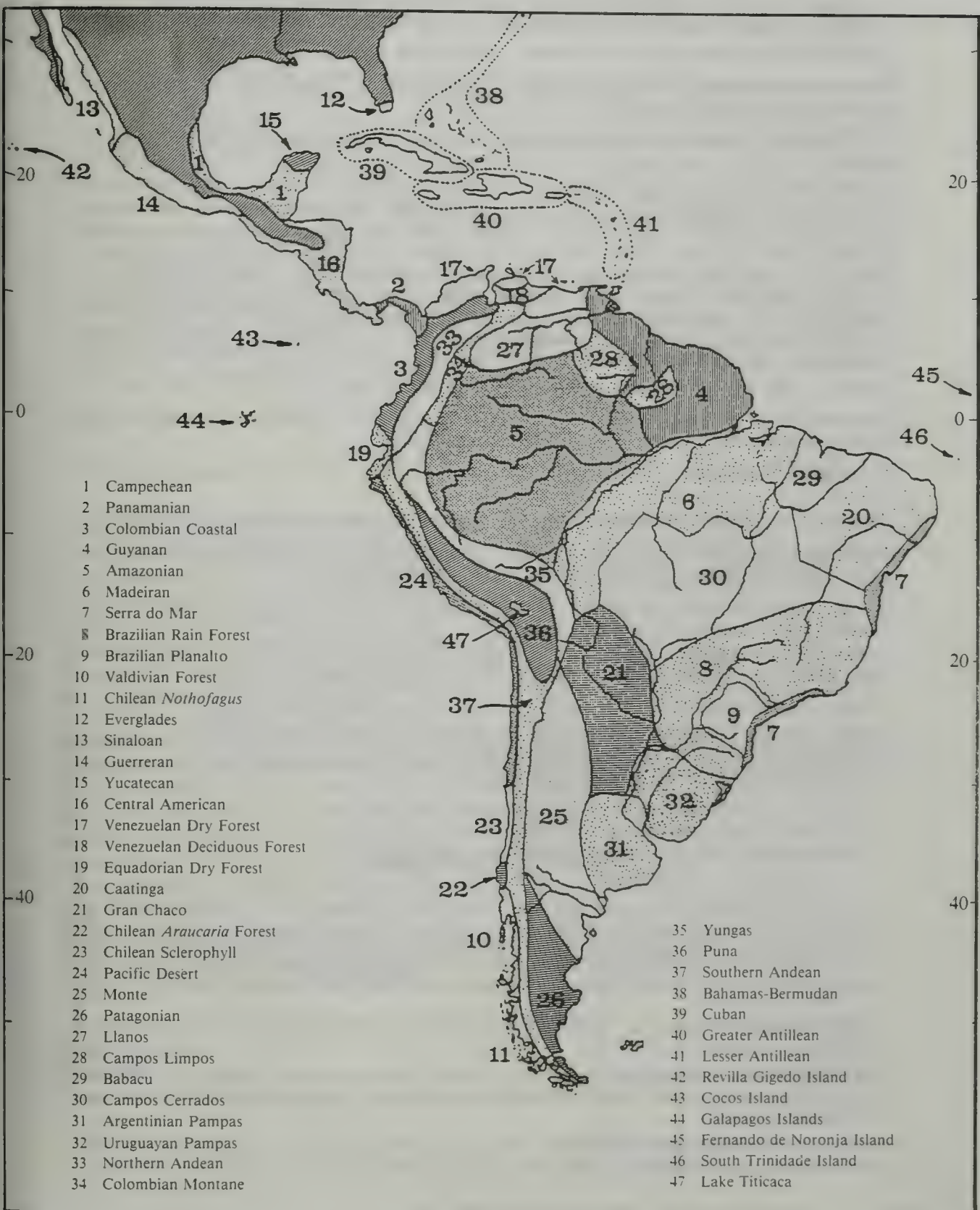
LEGAL PROTECTION: This covers both the degree of legal protection (eg., 100%), and special protection afforded to certain elements within the area. To qualify for the Directory a protected area must enjoy statutory legal protection establishing it as a permanently protected area and providing sufficiently strict safeguards to achieve the objectives of conservation of natural or of man-made landscapes.

DATE ESTABLISHED: Date and identification of the establishing decree or legislation.

GEOGRAPHICAL LOCATION: Province, region, latitude and longitude (it is expected that a new method, based on the Universal Transverse Mercator Grid system, will be established shortly).

ALTITUDE: The lowest and highest points of the area are included.

Map 1. Biogeographical provinces of the Neotropical Realm
(Udvardy, 1975)



AREA: The area, expressed in hectares, included within the establishing legislation, plus any subsequent additions. The minimum surface area for inclusion in the Directory is 1,000 hectares and this must consist entirely of zones in which protection of nature takes precedence (e.g. strict natural zones, managed natural zones or wilderness zones). Zones developed or modified for administrative or touristic purposes are excluded in calculating the minimum area. Exceptions may be made for islands.

LAND TENURE: Public (government-owned), freehold, private, etc.

PHYSICAL FEATURES: Topography, climate, hydrology, and other physical features, particularly as they affect management of the area.

VEGETATION: Dominant vegetation formation (eg., tropical rainforest), plus secondary formations; percentage coverage of each formation is included when possible. Dominant species are listed, along with any endangered species or species of particular economic importance.

NOTEWORTHY FAUNA: Species of mammals, birds, reptiles, amphibians, fish, etc. which are of particular importance due to their dominance in the ecosystem, rarity, presence of important populations, etc. Where known, populations of the key species are provided. In each case species which are included in the IUCN Mammal Red Data Book Part 1 (Thornback, J. and Jenkins, M., 1982, IUCN, Gland), The IUCN Red Data Book, Volume 2 Aves (1978, 1979, IUCN, Morges) or the IUCN Amphibia-Reptilia Red Data Book Part 1, Testudines, Crocodilia and Rhynchocephalia (Groombridge, B., in press, IUCN, Gland) are marked (E), (R), (V) or (I) depending on whether they are classified as Endangered, Rare, Vulnerable or Indeterminate within those publications.

ZONING: The system of zoning, where present, is described, with areas included in each zone.

DISTURBANCES AND DEFICIENCIES: The major management problems are described, including such things as poaching, fires, agricultural encroachment, etc.

SCIENTIFIC RESEARCH: Major research which has been conducted in the area, along with on-going projects.

SPECIAL SCIENTIFIC FACILITIES: Presence of laboratories, study plots, housing for scientists, etc.

PRINCIPLE REFERENCE MATERIAL: Major documents on the area, including the management plan, scientific monographs, popular books or articles, bibliographies, etc.

STAFF: The numbers of individuals regularly working in the area, with job classification (e.g. Superintendent, ranger, guard, clerk).

BUDGET: Annual budget, with year, in local currency and in US dollars (for ease of comparison). Other subventions, as from Unesco or WWF/IUCN, are also mentioned when relevant.

LOCAL ADMINISTRATION: The name and address of the local administrative entity for the area.

NAME OF CNPPA COORDINATOR: The name of the individual who prepared the sheet or coordinated its preparation; this individual will also be responsible for up-dating the sheet and should be sent any comments or corrections that need to be made.

COUNTRY SHEETS

AS WELL AS the data sheets describing the situation in each individual protected area, there are also 'Country Sheets' which give more information on the protected area system within each of the political units of the Neotropical Realm. Again the information is grouped under a series of headings.

AREA: The area of the country, or political unit, as given in the Times Atlas of the World, Sixth Edition (1980).

POPULATION: The population of the country or political unit as given in the Times Atlas unless more recent information is available. The date of the estimate is given in parentheses, and if a census is involved this is also mentioned.

PARKS AND RESERVES LEGISLATION: Basic details of the legislation dealing with the conservation units, and with the department or office responsible for running those units. Whenever possible the

numbers of the laws or decrees and their dates are given. Information is also given on how new areas are established.

PARKS AND RESERVE ADMINISTRATION: This gives rudimentary details on how the protected areas are run and by whom, including, wherever possible, definitions of each of the categories of conservation unit used in that country.

TOTAL AREA PROTECTED: The total in this section is calculated only from those areas which would be accepted on the United Nations List of Protected Areas (IUCN, in press), that is those areas protected in law by the highest competent authority, of over 1,000 ha (exceptions may be made in the case of islands) which are in management categories I-IV (see above). Biosphere Reserves are not included in this total as such.

PROTECTED AREAS: Here the protected areas within the country are listed, in the order in which the individual data sheets will follow. There will not necessarily be a data sheet for every conservation unit listed.

As for the data sheets on individual protected areas, this information is supplied by the CNPPA coordinators already mentioned above. Material was, however, incorporated from other sources as well, and special mention should be made of the paper by Wetterberg, G.B., Soares de Castro, C., Tresinari B. Quintao, A., Rocha Porto, E. (1978), *Estado atual dos parques nacionais e reservas equivalentes na america do sul-1978*, *Brasil Florestal* No. 36 (Out-Dez) Min. Agric. IBDF, Brasilia, in the English language edition published by the International Park Affairs Division of the US National Parks Service in 1980.

THE NEXT STEPS

THIS DIRECTORY will never be 'complete.' As the first volume in the series, it already suffers from the growing pangs of youth; many of the sheets contain only sparse data, available literature has not been thoroughly screened and integrated, information has seldom been field-checked, and areas administered by provincial or regional governments have not been included. Further, much of the data, such as on personnel, budget, and management deficiencies, is 'perishable' and needs regular up-dating.

It is also expected that the protected area in the Neotropical Realm will continue to grow in the coming years. In Brazil, for example, government policy is to add some 13,000,000 hectares to complete the country's protected area system. Significant additions are also expected from Peru, Ecuador, and Colombia. On the other hand, Chile is in the midst of a process of consolidation and realignment which will see a number of significant changes.

CNPPA has developed a procedure for bringing the Directory up-to-date on a regular basis. Approximately every three years, the Commission will hold a meeting somewhere in the Neotropical Realm; about 12 months before the meeting, the existing data sheets will be sent to the coordinators for each country with a request to ensure that all information is accurate and up-to-date and to provide additional data on specific areas where such data would be useful and pertinent (for example, presence of wild species of plants which are related to domestic plants). Efforts will be made to fill any blanks in the data, integrate new findings from field projects, and collect information from new areas, ensuring that the second edition of the *Directory of Neotropical Protected Areas* will be a major step forward.

In the meantime, the Research Officer at the Protected Areas Data Unit (Jeremy Harrison, PADU, Royal Botanic Gardens, Kew, Richmond, UK) will be collecting additional published information, receiving comments and suggestions on the basis of the information contained in the directory, and seeking ways and means of applying the data to real conservation problems on the ground. All contributions by readers will be very welcome.

Gland, Switzerland
23 July 1982

Kenton R. Miller
Jeffrey A. McNeely
Jeremy Harrison

ANTIGUA

AREA: 443 sq km.

POPULATION: 73,500 (1979).

PARKS AND RESERVES LEGISLATION: The Marine Parks are established and run under the Marine Parks Act, 1972. The Antigua National Trust Act (1972) also has provision for the setting up of parks, reserves and monuments.

PARKS AND RESERVES ADMINISTRATION: The running of the marine parks is the responsibility of the Fisheries Department of the Ministry of Agriculture, Lands and Fisheries. Presumably sites protected under the National Trust Act would be the responsibility of the Antigua National Trust.

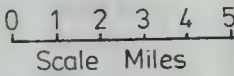
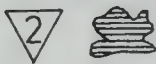
ADDRESS: Fisheries Department, Ministry of Agriculture, Lands and Fisheries, Government Headquarters, St John's, Antigua.

TOTAL AREA UNDER PROTECTION: 2,500 ha.

PROTECTED AREAS:

Marine Parks	(hectares)
1 Diamond Reef	2,000
2 Palaster Reef	500

BARBUDA

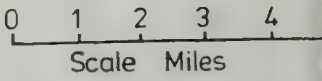


ANTIGUA



Key

▽ MARINE PARKS



(1) Diamond Reef Marine Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1973.

GEOGRAPHICAL LOCATION: Reef area lying about 5km off the north coast of Antigua; 17°15'N, 61°50'W.

ALTITUDE: -100 to 0m.

AREA: 2,000 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: Shallow calcium carbonate banks and extensive patch coral reefs.

VEGETATION: Calcareous algae, filamentous algae, and boring algae typical of patch reefs.

NOTEWORTHY FAUNA: Typical Caribbean coral reef fauna.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Fisheries Department, Ministry of Agriculture, Lands, and Fisheries.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 16 June 1981.

(2) Palaster Reef Marine Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1973.

GEOGRAPHICAL LOCATION: Reef area lying about 3km to the southeast of Cocoa Point, Barbuda; 17°30'N, 61°47'W.

ALTITUDE: -50 to 0m.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Shallow patch coral reefs.

VEGETATION: Calcareous algae, filamentous algae, and boring algae typical of patch reefs.

NOTEWORTHY FAUNA: Typical Caribbean reef fauna.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Some fishing.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Fisheries Department, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 16 June 1981.

ARGENTINA

AREA: 2,776,643 sq km.

POPULATION: 27,000,000 (1980).

PARKS AND RESERVES LEGISLATION: Law 22.35 of 12 December 1980 revised and modified the former Law of National Parks, Natural Monuments and National Reserves (law 18.594 of 6 February 1970), its regulatory decree 637 of 1970, and the old National Parks Law 12.103 of 1934, together with the more recent law on organization of the National Park Service (20.161/1972) and decree 2.811 of 1972. The 'Administracion de Parques Nacionales' has extensive authority and responsibility for the conservation of flora, fauna and the establishment of National Parks, Natural Monuments and National Reserves. The Administration has the right to expropriate lands, regulate land use, seize equipment used in illicit activities and to discharge staff not adhering to the law. The law contains specific rules for the executive powers of the Service.

PARKS AND RESERVES ADMINISTRATION: There are three categories of conservation area included under these laws. The National Park is regarded as an area to be conserved in its primitive state with alterations only being made if they are necessary to ensure adequate control of visitors. Natural Monuments are defined as regions, objects, animals or plants which are of aesthetic, historic or scientific interest and which should receive absolute protection. The National Reserve is an area of interest for the conservation of ecological systems and also for the maintenance of transition zones of certain of the National Parks. It is also used as an independent conservation zone associated with a National Park when the legal status of National Park is not given due to the situation in that area. One other category of protected area, the Nature Reserve, is not defined in current legislation. This only applied to one area, Formosa Nature Reserve. Administracion de Parques Nacionales, Ministerio de Economia, has ultimate authority for the management of National Park lands.

ADDRESS: Administracion de Parques Nacionales, Sante Fe 690, Buenos Aires, Argentina.

REFERENCES: Cabrera, Angel L. y Willink, Abraham (1975). Biogeografia de América Latina. OEA, Washington.

Correa Luna, Hugo y otros (1977). La Conservacion de la Naturaleza: los Parques Nacionales Argentinos. Servicio Nacional de Parques Nacionales, Buenos Aires. 3rd edition.

Direccion General de Parques Nacionales (1972). Parques Nacionales Argentinos. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Sante Fe 690, Buenos Aires, 72 pp.

Erize, Francisco y otros (1981). Los Parques Nacionales Argentinos. INCAFO, Madrid.

OEA (1979). La Conservacion de Ecosistemas Terrestres de Mayor Significacion en el Hemisferio Occidental. Seccion Latinoamerica. OEA, Washington.

Publicaciones varias, informes, proyectos, circulares, etc. de la Administration de Parques Nacionales: reports, projects, verbal communications, etc.

TOTAL AREA UNDER PROTECTION: 2,691,551 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Los Glaciares (World Heritage Site)	445,900
2 Nahuel Huapi	330,000
3 Lanin	194,600
4 Los Alerces	187,500
5 Perito Francisco P. Moreno	84,500
6 Calilegua	76,000
7 Baritu	72,439
8 Tierra del Fuego	63,000
9 Rio Pilcomayo	50,000

10	Iguazu	49,200
11	El Ray	44,162
12	Chaco	15,000
13	Lago Puelo	14,100
14	Lihuel Calel	9,000
15	El Palmar	8,500
16	Laguna Blanca	8,250
17	Los Arrayanes	1,000
Nature Reserve		
1	Formosa	10,000
National Reserves		
1	Nahuel Huapi	428,100
2	Lanin	184,000
3	Los Glaciares	154,100
4	Los Alerces	75,500
5	Perito Francisco P. Moreno	30,500
6	Lago Puelo	9,600
7	Iguazu	6,300
8	Laguna Blanca	3,000
9	El Palmar	1,200
National Monuments		
1	Laguna de Pozuelos	28,000
2	Petrified Forests	10,000
Wildlife Sanctuary		
1	Gulf of San Jose Right Whale Sanctuary*	Unknown
Biosphere Reserve		
1	San Guillermo	981,000
Provincial Nature Reserve		
1	Laguna Blanca*	770,000

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.



(1) Los Glaciares National Park & Reserve

MANAGEMENT CATEGORY: II, IV & IX (National Park, Managed Nature Reserve & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.11.2/8.37.12 (Chilean *Nothofagus*/Southern Andean).

LEGAL PROTECTION: The park is totally protected, the reserve partially.

DATE ESTABLISHED: 11 May 1937 by Law 13.895 and Decrees No. 105.433/37 and No. 125.596/38; Decree-Law 9.504 of 28 April 1945 and Law 19.292 of 11 October 1971.

GEOGRAPHICAL LOCATION: Southern Argentine Andes, southwest Santa Cruz Province, on the Chilean border; 49°15'-50°40'S, 73°W

ALTITUDE: 200-3,500m.

AREA: Park: 445,900 ha. Reserve: 154,100 ha.

LAND TENURE: The Park is government owned; so is most of the Reserve, though a few small settlements still remain.

PHYSICAL FEATURES: Andean mountains with several spectacular sharp needle-like peaks and large lakes. Large glaciers, including some outstanding examples of glacier movement and erosion. Climate is cold and damp.

VEGETATION: Andean-Patagonian forests. Principal species include southern beech *Nothofagus antarctica*, *N. pumilio*, *N. betuloides* (present over extensive areas) and *N. dombeyi* (southernmost distribution); *Fuchsia magellanica*, Winter's bark *Drimys winteri*, *Ribes magellanicus*, *Berberis buxifolia*, *Pernettya mucronata* and *Philesia buxifolia*. Patagonian steppe to the east and snow-covered mountains and glaciers to the west.

NOTEWORTHY FAUNA: Rich fauna includes little armadillo *Zaedyus p. pichiy*, chinchilla mouse *Euneomys* sp., mara *Dolichotis patagonum*, coypu *Myocaster coypus santacruzae*, tucotuco *Ctenomys* sp., puma *Felis concolor pearsoni*, guanaco *Lama guanicoe*, southern Andean huemul *Hippocamelus bisulcus* (E); chinchillon *Lagidium wolffsohni*, grey fox *Dusicyon griseus*, skunk *Conepatus humboldti*; birds include lesser rhea *Pterocnemia pennata*, Patagonian tinamou *Tinamotis ingoufi*, night-heron *Nycticorax n. obscurus*, plumbeous rail *Rallus sanguinolentus landbecki*, rufous-collared sparrow *Zonotrichia capensis australis*, flying steamer duck *Tachyeres patachonicus*, ashy-headed goose *Chloëphaga poliocephala*, magellanic woodpecker *Campephilus magellanicus*; snakes recorded include *Bothrops ammodytoides*.

ZONING: A National Park and a National Reserve. Development is confined to the Reserve, which is subdivided into 3 zones.

TOURISM: More than 9,000 visitors per year. Small hotels, camping and picnic areas in the Reserve.

DISTURBANCES OR DEFICIENCIES: Large areas have been burnt over by uncontrolled forest fires. Poaching of guanaco was previously a problem, but is practically curbed now. European hare *Lepus europaeus* and cattle cause problems.

SCIENTIFIC RESEARCH: Flora inventory. Vertebrate inventory. Meteorological observations. Observatory for atmospheric pollution.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Direccion General de Parques Nacionales (1959). Reductos Pristicos de la Naturaleza. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Santa Fe 690, Buenos Aires,

Direccion General de Parques Nacionales (1972). Parques Nacionales Argentinos. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Santa Fe 690, Buenos Aires, 72 pp.

STAFF: 1 Superintendent, 6 guards or rangers and 20 administrative staff and workers.

BUDGET: US\$ 416,033 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Los Glaciares, Administracion de Parques Nacionales, Lago Argentino, Provincia de Santa Cruz, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(2) Nahuel Huapi National Park & Reserve

MANAGEMENT CATEGORY: II & IV (National Park & Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.37.12 (Valdivian Forest/Southern Andean).

LEGAL PROTECTION: The park is totally protected, the reserve partially.

DATE ESTABLISHED: 9 October 1934 by Law 12.103 and by a further Decree (8 April 1972), modified by Laws 14.487, 19.292 (11 October 1971), 20.594 and 21.602.

GEOGRAPHICAL LOCATION: Argentine Andes, Neuquén and Rio Negro Provinces; 40°20'-41°35'S and 71°-72°W.

ALTITUDE: 720-3,574m.

AREA: Park: 428,100 ha. Reserve: 330,000 ha.

LAND TENURE: The park is Government owned (the original 7,500 ha donated by F.P. Moreno in 1903). The Reserve is partially government and partially privately owned.

PHYSICAL FEATURES: This area is part of the Andean mountain chain, and includes several lakes and rivers. The western boundary is formed by the Chilean frontier. Geologically it is composed of tertiary rocks with volcanics, andesites and porphyrys. There are also numerous glacial features within the area including of course the lakes, and glacial erosion is evident on the cliffs of the San Pedro peninsula, and Victoria Island. Climate is temperate with a wide range in temperature, precipitation varying from 500 to 3,000mm annually.

VEGETATION: The eastern part has xerophytic Patagonian vegetation, the west temperate rain forest. Principal species include southern beech *Nothofagus dombeyi*, *N. pumilio*, *N. antarctica*, 'alerces' *Fitzroya cupressoides*, Chilean cedar *Austrocedrus chilensis*, Winter's bark *Drimys winteri*, *Myrceugenella apiculata*, *Lomatia ferruginea*, *L. hirsuta*, *Alstroemeria aurantiaca*, *Fuchsia magellanica*, bamboo *Chusquea culeou*, *Mitraria coccinea* and *Embothrium coccineum*.

NOTEWORTHY FAUNA: A limited variety of species but a good population of smaller animals. Principal species include southern Andean huemul *Hippocamelus bisculus* (E), opossum *Dromiciops australis*, southern river otter *Lutra provocax* (I), culpeo fox *Dusicyon c. culpaeus*, puma *Felis concolor*, tiger cat or kodkod *F. guigna* and pudu deer *Pudu pudu*. Avifauna includes blue-eyed cormorant *Phalacrocorax a. atriceps* (only known colony in fresh water), kelp gull *Larus d. dominicanus*, chucac tapaculo *Scelorchilus rubecula*, upland goose *Chloephaga picta*, torrent duck *Merganetta armata*, austral parakeet *Enicognathus ferrugineus*, Andean condor *Vultur gryphus* and green-backed firecrown *Sebanoides galeritus*. Amphibia include *Hylorina sylvatica* and *Bufo spinulosus*.

ZONING: Subdivided into two zones - national park and national reserve, development being confined to the latter. The town of San Carlos de Bariloche, all smaller settlements and summer homes have now been zoned out of the park. The whole area is further subdivided into three zones: northern, central and southern, plus the Cerro Cathedral Recreation Area.

TOURISM: There are more than 350,000 visitors a year. Facilities include hotels, a visitors' centre, camping and picnic areas, cablecars, ski slopes and lifts.

DISTURBANCES OR DEFICIENCIES: Uncontrolled forest fires are a permanent threat. Introduced red deer *Cervus elaphus*, dama deer *Dama dama*, European wild boar *Sus scrofa*, mink *Mustela vison*, European hare *Lepus europaeus* and the Californian quail *Lophortyx californica* are still a problem. Cattle and other domestic animals roam in some portions of the reserve and the park. Nahuel Huapi lake in particular is being polluted by the city of Bariloche and other settlements and by ships and boats throwing oil and garbage into the waters.

SCIENTIFIC RESEARCH: Studies on the biology and distribution of the threatened *Lutra provocax*. Studies on the biology of *Aegla* (Crustacea, Decapoda). Experimental breeding of *Pudu pudu*. Control of *Rosa eglandaria*, a woody weed. Studies on the biology of *Salvelinus fontinalis*, the exotic stream trout. Studies of the exotic *Mustela vison* and its environmental impact. Flora inventory. Vertebrate inventory. Meteorological observations.

SPECIAL SCIENTIFIC FACILITIES: Training school for national park guards, also open to foreign participants. Patagonian museum in San Carlos de Bariloche with laboratories and exhibits of flora and fauna, and of geological and historical interest.

PRINCIPAL REFERENCE MATERIAL: Direccion General de Parques Nacionales (1972). Parque Nacional Nahuel Huapi. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Sante Fe 690, Buenos Aires, 20 pp.

STAFF: 1 superintendent, 40 guards and 147 administrative staff and workers.

BUDGET: US\$ 1,987,169 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Nahuel Huapi, Administracion de Parques nacionales, San Carlos de Bariloche, Rio Negro, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(3) Lanin National Park and Reserve

MANAGEMENT CATEGORY: II & IV (National Park & Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.37.12 (Valdivian Forest/Southern Andean).

LEGAL PROTECTION: The park is totally protected, the reserve partially.

DATE ESTABLISHED: 11 March 1937 by Law 13.895, Decrees 105.433/37 and 125.596/38; Decree-Law 9.504/45; Law 19.292/71; Law 19.301.

GEOGRAPHICAL LOCATION: Western Neuquen province in the Argentine Andes; 39°07'-40°44'S, 71°07'-49'W.

ALTITUDE: 600-3774m.

AREA: Park: 194,600 ha. Reserve: 184,400 ha.

LAND TENURE: The park is government owned. The reserve is still partly privately owned.

PHYSICAL FEATURES: Located in the southern Argentine Andes, with the western border formed by the Chilean frontier. Mountainous, with the extinct volcano of Lanin one of the main points of interest. Features include several impressive lava fields, hot springs (60°-80°C) and glacial features, including a number of lakes (all of which are aligned in an east-west direction).

VEGETATION: Andean-Patagonian forests. Principal species include Chile pine (monkey puzzle) *Araucaria araucana*, southern beech *Nothofagus dombeyi*, *N. nervosa*, *N. obliqua* and *N. antarctica*, Chile cedar *Austrocedrus chilensis*, *Berberis* sp., *Embothrium coccineum*, *Cassia arnothiana*, *Schinus crenatus*, *Aristotelia* sp., *Alstroemeria aurantiaca*, *Mitraria coccinea*, *Mutisia decurrens* and *M. retusa*. The lower areas are occupied by Patagonian steppe.

NOTEWORTHY FAUNA: Principal mammal species include southern river otter *Lutra provocax* (I), opossum *Dromiciops a. australis*, rice rat *Oryzomys longicaudatus philippii*, coypu *Myocastor coypus melanops*, the grey fox *Dusicyon griseus gracilis*, culpeo fox *D. culpaeus*, puma *Felis concolor araucanus* and tiger-cat or kodkod *F. g. guigna*. Avifauna includes white-tufted grebe *Podiceps rolland chilensis*, great grebe *P. major*, Andean condor *Vultur gryphus*, austral parakeet *Enicognathus ferrugineus minor* and white-crested elaenia *Elaenia albiceps chilensis*. Fish include southern pikelet *Galaxias* sp. and southern salmon *Haplochiiton* sp. Amphibia include *Rhinoderma darwini*.

ZONING: The whole area is divided into a northern, a central and a southern zone. The reserve is also subdivided into three zones.

DISTURBANCES OR DEFICIENCIES: It is uncertain whether private holdings, stock-raising and forestry have now been totally excluded. Sport-fishing is another potentially disturbing factor. Exotic species include red deer *Cervus elaphus*, jabali (wild boar) *Sus scrofa*, European hare *Lepus europaeus* and rabbit *Oryctolagus cuniculus*, a recent invader from the northeast. Within the Reserve boundaries there are two hunting lots for exotic species, and this also has a disturbing impact on wildlife.

SCIENTIFIC RESEARCH: Flora inventory. Vertebrate inventory. Metereological observations. Control of the woody weed *Rosa eglanteria*.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A superintendent, 23 guards (rangers) and 56 administrative staff and workers.

BUDGET: US\$ 718,956 in 1981 (salaries not included)

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Lanin, Administracion de Parques Nacionales, San Martin de los Andes, Neuquen, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(4) Los Alerces National Park and Reserve

MANAGEMENT CATEGORY: II & IV (National Park and Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.37.12 (Valdivian Forest/Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 May 1937, Law 13.895, Decree 105.433; Decree-Law 9.504, 23 April, 1945; Law 19.292, 11 October 1971.

GEOGRAPHICAL LOCATION: Chubut province in the Argentine Andes; 42°10'-20'S, 71°35'-72°10'W.

ALTITUDE: 400-2,280m.

AREA: Park: 187,500 ha. Reserve: 75,500 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: Southern Andean mountains with the western boundary formed by the frontier with Chile. Glaciated mountains, lakes, rivers and montane forest. Some of the lakes reach almost 700m in depth. Temperate climate, with variable precipitation increasing from east to west.

VEGETATION: Andean-Patagonian forests. The park was created to protect the large stands of 'alerces' *Fitzroya cupressoides*. Other species include southern beech *Nothofagus dombeyi*, *N. pumilio*, *N. antarctica*, Winter's bark *Drimys winteri*, *Lomatia hirsuta*, *Myrceugenella spiculata*, *Podocarpus nubigena*, *Mutisia retusa*, *M. decurrens*, *Buddleia globosa*, *Fuchsia magellanica* and *Alstroemeria aurantiaca*.

NOTEWORTHY FAUNA: Principal mammal species are the opossum *Dromiciops australis*, the big-eared brown bat *Histiotus montanus magellicanus*, the long-clawed mouse *Notiomus valdivianus*, the grey fox *Dusicyon griseus gracilis*, culpeo fox *D. culpaeus*, puma *Felis concolor araucanus*, tiger cat *F. guigna*, pudu deer *Pudu pudu* and Southern Andean huemul *Hippocamelus bisulcus* (E); birds include pied-billed grebe *Podilymbus podiceps antarcticus*, spectacled duck *Anas specularis*, bicoloured hawk *Accipiter bicolor chilensis*, caracara *Milvago chimango temcoensis*, Chilean flicker *Colaptes pitius pitius*, Falkland thrush *Turdus falklandii magellanicus*, buff-necked ibis *Theristicus caudatus*, white-sided hiliar *Oreotrochilus leucopleurus*, Chilean pigeon *Columba araucana* and chucao *Scelorchilus rubecula*;

Amphibia include horned toad *Bufo spinulosus*, *B. variegatus* and *Rhinoderma darwini*. Fish include southern pike *Galaxias* sp., southern salmon *Haplochiton* sp., *Patagonina* sp. and South American perch *Percichthys* sp.

ZONING: National park and national reserve, with all types of development being located in the reserve.

TOURISM: More than 30,000 visitors per year. Hotels, camping, an administrative centre and a visitors' centre for environmental education are available.

DISTURBANCES OR DEFICIENCIES: A large hydroelectric dam and station have been built in the park, flooding over a thousand hectares of forest and linking four lakes. Forest fires have been a problem. Grazing by domestic stock is reported to have been largely eliminated. European hare *Lepus europaeus*, jabali (wild boar) *Sus scrofa* and mink *Mustela vison* are causing problems in the area.

SCIENTIFIC RESEARCH: Vertebrate inventory. Studies of the exotic *Mustela vison* and its impact on the environment and wildlife. Flora inventory. Meteorological observations. Project research on the control of 'rosa mosqueta' *Rosa eglanteria*, a woody weed.

SPECIAL SCIENTIFIC FACILITIES: Minimum.

PRINCIPAL REFERENCE MATERIAL: Direccion General de Parques Nacionales (1959). Reductos Pristicos de la Naturaleza. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Sante Fe 690, Buenos Aires. 51 pp.

STAFF: 2 field guides, 14 guards or rangers and 42 administrative staff and workers.

BUDGET: US\$ 512,798 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Los Alerces, Administracion de Parques Nacionales, Futalafquen, Province del Chubut, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(5) Perito Francisco P. Moreno National Park and Reserve

MANAGEMENT CATEGORY: II & IV (National Park & Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.11.2/8.37.12 (Chilean *Nothofagus*/Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 May 1937 by Law 13.895, Decrees 105.433/37 and 125.596/38; Decree 118.660, 30 April 1942; Decree-Law 9.504, 28 April 1945; Law 19.292, 11 October 1971.

GEOGRAPHICAL LOCATION: Northwest sector of Santa Cruz province in the Argentine Andes; 47°30'S, 72°40'W.

ALTITUDE: 900-2,776m.

AREA: Park: 84,500 ha. Reserve: 30,500 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Located in the Southern Andean mountains on the border with Chile, and including the divide between Pacific and Atlantic drainage. Mountainous irregular topography with glaciated landforms including moraines. Climate is cold with frequent snow during summer and strong westerly winds. Important anthropological and archaeological sites include Indian tombs and caverns with wall paintings.

VEGETATION: Andean-Patagonian forest with tree line at about 1100m. Principal species include

southern beech *Nothofagus pumilio* and *N. antarctica*, *Berberis cuneata* and grassland of *Festuca* sp., *Poa* sp. and *Stipa* sp.

NOTEWORTHY FAUNA: Principal mammals are South Andean huemul *Hippocamelus bisulcus* (E), little armadillo *Zaedyus p. pichi*, colpeo fox *Dusicyon culpaeus magellanicus*, puma *Felis concolor patagonica*, Geoffroy's tiger cat *F. geoffroyi* and guanaco *Lama guanicoe*. Birds include Andean condor *Vultur gryphus*, kelp goose *Chloëphaga h. hybrida*, upland goose *C. picta*, red shoveler *Anas platalea*, blue-winged teal *A. discors*, dolphin gull *Leucophaeus scoresbii*, lesser Rhea *Pterocnemia pennata*, Patagonian tinamou *Tinamotis ingoufi* and white-bellied seedsnipe *Attagis malovinus*. Fish species include southern lamprey *Geotria* sp., *Patagonina* sp., southern pikelet *Galaxia* sp. and South American perch *Pericichthys* sp.

ZONING: A National Park zone and a National Reserve zone, with some development in the reserve area.

DISTURBANCES OR DEFICIENCIES: Some disturbance in the eastern portion, due to cattle and sheep. Access is very poor, tourism being practically absent.

SCIENTIFIC RESEARCH: Scarce, and mainly on archaeology and anthropology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A ranger and a worker, no permanent staff.

BUDGET: US\$ 170,633 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Los Glaciares, Administracion de Parques Nacionales, Lago Argentino, Provincia de Santa Cruz, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(6) Calilegua National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.25.07 (Monte).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1979 by Decree 1.733.

GEOGRAPHICAL LOCATION: Eastern Jujuy province, northwest Argentina; 23°30'S, 64°45'W.

ALTITUDE: 450-3,160m.

AREA: 76,000 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Rugged, broken country with abrupt mountain ranges and narrow deep valleys, on the Sierra de Calilegua. There are many rivers and creeks which flow through the Rio San Francisco and finally into the Bermejo river. The mean temperature is 21°C, and annual precipitation 1,000mm in the foothills, 2,000mm higher up. Fogs are common from 800-900m.

VEGETATION: Subtropical rain forests, with transitional cloud-forests (yungas) up to 500m, and montane rain forest to 1,800m. Montane forest reaches 2,500m. Above this are montane grasslands with few and scattered trees. Principal species are whitewood *Calycophyllum multiflorum*, cedro salteno *Cedrelo angustifolia*, tipa blanca *Tipuana tipu*, horco molle *Blepharocalyx gigantea*, mountain pine *Podocarpus parlatorei*, the fern *Pteris deflexa* and an abundance of epiphytes and climbers.

NOTEWORTHY FAUNA: Northern Andean huemul *Hippocamelus antisensis* (V), jaguar *Panthera*

onca (V), capuchin monkey *Cebus apella*, squirrel *Sciurus ignitus* and tayra *Eira barbara*. Among the birds are the fasciated tiger heron *Tigrisome fasciatum*, dusky-legged guan *Penelope obscura*, roadside hawk *Rupornis magnirostris* and stygian owl *Asio stygius*. Amphibia include *Atelopus rubriventris* and *Gastrotheca christiani*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: The national petroleum company is drilling 20 exploration pits in the northeastern area of the Park. At least 30% of the Park is in recovery after lumbering. Selective cutting was practised, so the best timber was taken away.

SCIENTIFIC RESEARCH: Evaluation of bird populations in the forest understorey. Flora inventory. Meteorological observations to be started.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A ranger.

BUDGET: US\$ 191,488 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Superintendent of the Parque Nacional El Rey.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(7) Baritu National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.25.07 (Monte).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1974, by Law 20.956 and Decree 12.534.

GEOGRAPHICAL LOCATION: In the northern sector of the province of Salta, northwest Argentina; 22°30'S and 64°45'W.

ALTITUDE: 700-2,000m.

AREA: 72,000 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Broken relief, with mountain peaks about 2,000m high. Many water courses which run along steep canyons and flow into the Bermejo River. The river forms the boundary of the park along the Bolivian border. Subtropical humid climate.

VEGETATION: Subtropical rain forest on the mountains, with greater floristic richness than in the lowlands. Both Bolivian and Brazilian elements are present. Notable species include the giant cedars *Cedrela balanse* and *C. lilloi*, the tree fern *Cyathea odonelliana*, chonta palm *Acrocomia chunta*, whitewood *Calycophyllum multiflorum*, tipa blanca *Tipuana tipu*, horco molle *Blepharocalyx gigantea* and mountain pine *Podocarpus parlatorei*.

NOTEWORTHY FAUNA: Tree porcupine *Coendu prehensilis*, sloth *Bradypus boliviensis*, jaguar *Panthera onca* (V), rabbit *Sylvilagus brasiliensis*, agouti *Dasyprocta punctata*, La Plata otter *Lutra platensis* (B) and margay *Felis wiedii* (V). Birds include Andean guan *Penelope montagnii*, red-faced guan *P. dabbeni*, golden-collared macaw *Ara auricollis*, Orinoco goose *Neochen jubata*, king vulture *Sarcorhamphus papa* and various eagle species (Accipitridae).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Very little disturbance, due to inaccessibility (because of its isolation it is most easily reached from the Bolivian side). A road is planned along its western border.

SCIENTIFIC RESEARCH: Evaluation of bird populations in the forest understorey. Flora inventory. Meteorological observations to be started.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A ranger and a labourer.

BUDGET: US\$ 174,844 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Superintendent of Parque Nacional El Rey.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(8) Tierra del Fuego National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.37.12 (Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1960 by Law 15.554.

GEOGRAPHICAL LOCATION: The western part of Tierra del Fuego province, extreme southern Argentina, with the Chilean border forming the western boundary and the Beagle Channel the southern boundary; 54°50'S, 68°30'W.

ALTITUDE: Sea level to 1,000m.

AREA: 63,000 ha.

LAND TENURE: Government-owned.

PHYSICAL FEATURES: Very rugged topography with mountains, valleys, rivers, lakes and glaciated areas. This is the only Argentine national park that has a shoreline. A temperate cold climate with frequent rain, fog and strong winds. Annual mean temperature for Ushuaia, the nearest town, is 5.4°C with a maximum monthly mean of 14.2°C and a minimum of -2.4°C. There are relicts of former Indian occupation.

VEGETATION: Forests of southern beech species *Nothofagus pumilio*, *N. antarctica* and *N. betuloides*. Other species include *Berberis buxifolia*, *Embothrium coccineum*, Winter's bark *Drimys winter* and crowberry *Empetrum rubrum*, and the whole area is very rich in mosses. The autumn colour of the forests is very impressive.

NOTEWORTHY FAUNA: Good populations of guanaco *Lama guanicoe* and sea lions are reported, and the typical seabirds of these latitudes - petrels, albatrosses and penguins - are known to be well represented. Correa Luna (1977) also records South Andean huemul *Hippocamelus bisculus* (E), southern river otter *Lutra provocax* (I) and *Dusicyon culpaeus*, the culpeo fox (though not the hoary fox *D. vetulus* reported in the 2nd edition of the UN List).

ZONING: A national park zone and an intensive use zone.

TOURISM: A hostel and an administrative centre. Trails, boat trips, sport-fishing and skiing are all available, and there are further hotels in Ushuaia and Lapataia.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Only two units reported in 1966; no recent information to hand.

BUDGET: Quoted as US\$ 4,000 in 1966/67; no recent figures have been provided.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendente, Parque Nacional Tierra del Fuego, Servicio Nacional de Parques Nacionales, Lapataia, Tierra del Fuego, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(9) Rio Pilcomayo National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 September 1951, by Laws 14.073 and 17.915.

GEOGRAPHICAL LOCATION: On the Paraguayan border in Formosa province, northern Argentina; 25°S, 58°W.

ALTITUDE: 100-200m.

AREA: 50,000 ha.

LAND TENURE: Government ownership; however over a third of the park area was previously reported as common or privately-owned land, and this still applies to a considerable section. There is an indigenous Indian population.

PHYSICAL FEATURES: The park is located at the confluence of the Pilcomayo and the Paraguay Rivers lying on the southern banks of those rivers. The plains are characterized by marshland, savannas, and palm forests with several smaller areas occupied by humid forests of the Chaco type. The climate is humid/subhumid hot in summer, with the annual average temperature being 23°C and annual average precipitation 1,200mm.

VEGETATION: Marshlands, savannas, gallery forests and Chaco-type forest. The area is of particular interest because it is transitional between eastern chaco and rainforest. Principal species include the 'Caranuba' palm *Copernicia alba*, *Caesalpinia melanocarpa*, quebracho-wood *Schinopsis balansae*, *Ruprechtia polystachya*, *ocotea suaveolens*, *Astronium balansae*, the mezquite species *Prosopis nigra* and *P. alba*, *Acacia caven*, *Celtis spinosa*, *Tabebuia nodosa* and *T. ipe*, *Bromelia serva*, *Aechmea distichanta*, *Eupatorium* spp. and various cacti *Cereus* and *Opuntia* spp.

NOTEWORTHY FAUNA: Relatively rich, including such mammals as maned wolf *Chrysocyon brachyurus* (V), La Plata otter *Lutra platensis* (V), giant anteater *Myrmecophaga tridactyla* (V), opossum *Didelphis azarae*, coypu *Myocastor coypus*, crab-eating fox *Cerdocyon thous*, *Dusicyon* sp., coati *Nasua n. cinerascens*, puma *Felis concolor osgoodi*, Geoffroy's wild cat *Felis geoffroyi* and tapir *Tapirus terrestris*. Birds include greater rhea *Rhea americana albescens*, red-winged tinamou *Rhynchotus r. rufescens*, southern screamer *Chauna torquata*, comb duck *Sarkidiornis melanotis*, crested caracara *Polyborus plancus*, dusky-legged guan *Penelope obscura*, turquoise-fronted parrot *Amazon aestiva xanthopteryx* and various humming birds such as *Hylocharis*, *Heliomaster* and *Chlorostilbon* spp. OAS (1978) also record giant armadillo *Prionates giganteus* (V) and jaguar *Panthera onca* (V).

ZONING: Not clearly defined, but there is a national park zone, and also an intensive use zone near Laguna Blanca.

TOURISM: Little developed; there is no accommodation although some facilities are planned and an administrative centre has been established.

DISTURBANCES OR DEFICIENCIES: None reported, but so far as is known the park remains inadequately staffed despite the proximity of the town of Asuncion.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Direccion General de Parques Nacionales (1959). Reductos Pristinos de la Naturaleza. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Sante Fe 690, Buenos Aires. 51 pp.

STAFF: The staff in 1966 was only an officer-in-charge and a guard and, although representations were made by ICNP, it is not known how far the situation has been improved.

BUDGET: A figure of US\$ 2,500 was quoted in 1967.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque Nacional Pilcomayo, Servicio Nacional de Parques Nacionales, Laguna Blanca, Formosa, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(10) Iguazu National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rainforest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: The park was officially created 9 October 1934 by Law 12.103 with 55,000 ha, but creation was initiated as early as September 1909 by Law. 6.712. Modifications were made in 1971 and 1972 by Decree-laws 18.991 and 19.478, while the National Reserve was created in 1979 by Decree-law 18.801.

GEOGRAPHICAL LOCATION: On the border with Brazil and less than 5km from the Paraguayan frontier in Misiones Province, northern Argentina; 25° 36'S, 54°34'W.

ALTITUDE: 100-300m.

AREA: National park: 49,200 ha. National Reserve: 6,300 ha.

LAND TENURE: Government-owned; but it is uncertain whether the 500 ha of common land and 6000 ha owned by the town of Puerto Iguazu on the western border of the park have yet been taken over.

PHYSICAL FEATURES: The northern border is formed by the Brazilian frontier and the Iguazu river. The park has part of one of the world's largest and most impressive waterfalls (the other part being in Brazil) with a height of 80m extending over 2,700m. A basaltic plateau with red semi-lateritic soils. A humid subtropical climate with an annual mean temperature of 20°C, a summer mean of 33°C and a winter mean of 9°C. Annual rainfall is more than 2,000mm, distributed fairly evenly throughout the year; relative humidity often near 90%.

VEGETATION: Subtropical wet forest, rich in lianes and epiphytes. Principal tree species include *Cedrela tubiflora*, *Cordia trichotoma*, *Aspidosperma polyneuron*, *Myocarpus frondosus*, *Enterolobium contortisiliquum*, *Nectandra saligna*, *Ocotea puberula*, *Ficus monckii*, *Araucaria angustifolia*, the palmito *Euterpe edulis*, angico gum tree *Piptadenia rigida*, the 'paino de seda' *Chorisia speciosa* and the bamboos *Guadua trimii* and *G. angustifolia*. Epiphytes include species of *Miltonia*, *Catesetum* and *Oncidium*. The Bromeliaceae are represented by the genera *Aechmea*, *Vriesea* and Spanish moss *Tillandsia*, and other epiphytic species include the tree fern *Dicksonia selowiana*.

NOTEWORTHY FAUNA: The mammals include La Plata otter *Lutra platensis* (V), ocelot *Felis pardalis* (V) and jaguar *Panthera onca* (V), capuchin monkey *Cebus paraguayanus*, giant anteater *Myrmecophaga*

tridactyla (V), tamandua *Tamandua tetradactyla*, crab-eating raccoon *Procyon cancrivorus nigripes*, coati *Nasua solitaria*, tiger-cat *Felis tigrina* (V), jaguarondi *F. yaguarundi* and tapir *Tapirus terrestris*. Among the birds are spotted nothura *Nothura maculosa maculosa*, white-necked heron *Ardea cocoi*, black-fronted piping guan *Aburria jacutinga* (E), toco toucan *Ramphastos toco albigularis* and ferruginous pygmy owl *Glaucidium b. brasilianum*. Reptiles include the rattlesnake *Crotalus t. terrificus*, the pit viper or urutu *Bothrops alternatus*, and *Cyclagras gigas*, while amphibians are represented by *Bufo marinus paraenemis*. Fish include the leopard catfish *Pimelodus maculatus* and *P. clarias*. Correa Luna (1977) also records giant Brazilian otter *Pteronura brasiliensis* (V), as well as black-capped capuchin *Cebus apella* and black howler *Alouatta caraya*.

ZONING: National park zone with a totally protected (intangible) sub-zone; national reserve zone which includes the intensive use zone.

TOURISM: Approximately 200,000 visitors in 1972 with numbers rapidly increasing. Facilities include an international airport, hotel, youth camp, camp and picnic grounds, kiosks, restaurants, an extensive network of trails, launches for boat trips and a small museum in the administrative centre located in the town of Puerto Iguazu. There are plans for more tourist facilities.

DISTURBANCES OR DEFICIENCIES: Some illegal hunting and cutting of palmito *Euterpe edulis* for edible palm hearts.

SCIENTIFIC RESEARCH: Mainly on the ecology, flora and fauna.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Servicio Nacional de Parques Nacionales (1972). Parque Nacional Iguazu. 9 pp. (stencilled report).

STAFF: A superintendent, 48 guards and workers (1973).

BUDGET: US\$ 135,00 estimated for 1973.

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Intendente, Parque Nacional Iguazu, Servicio Nacional de Parques Nacionales, Puerto Iguazu, Misiones, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(11) El Rey National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 June 1948 by Decree 18.800.

GEOGRAPHICAL LOCATION: Salta province, northern Argentina, 80km east of Salta; 24°30'S, 64°40'W.

ALTITUDE: 1,000-1,800m.

AREA: 44,162 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: The junction of the Chaco plains with the Andean region, it has varied and rough topography, difficult to penetrate. The abrupt start to the mountain effectively cuts the park off from Salta city. This inaccessibility has assisted in the protection of the area. Subtropical climate, but this is of course dependent on altitude.

VEGETATION: Three vegetation zones: valley, higher slopes and ridges, with fringing forest in the

gullies. Principal species include various mimosas *Acacia aroma*, *A. caven*, *A. furcata*, *A. praecox*, mezquite *Prosopis alba*, cacti such as *Opuntia* spp. and *Cereus* spp., *Celtis spinosa*, *Erythrina falcata*, *Cercidium australe*, *Geoffroea decorticans*, cedar *Cedrela balansae*, southern butternut *Juglans australis*, *Sambucus peruvianus*, *Berberis laurina*, *Baccharis* spp., *Piptadenia macrocarpa*, *Pterogyne nitens*, *Chorisia insignia* and the balsam *Myroxylon peruiferum*. Above 1600m alpine prairies and herbaceous prairies are predominant, interrupted by alders *Alnus jorullensis* var. *spachi* and mountain pines *Podocarpus parlatorei*.

NOTEWORTHY FAUNA: Mammals include La Plata Otter *Lutra platensis* (V), jaguar *Panthera onca* (V), vampire bat *Desmodus r. rotundus*, crab-eating fox *Cerdocyon thous entrerianus*, coati *Nasua solitaria cinerascens*, puma *Felis concolor*, tapir *Tapir terrestris spegazzini* and brocket deer *Mazama simplicornis* and *M. rufa*. Avifauna includes guans and piping guans *Penelope* spp., and *Aburria* spp., red-legged seriema *Cariama cristata*, buff-necked ibis *Theristicus c. cardatus* and ocellated piculet *Picumnus dorbygnianus*. Reptiles include rattlesnake *Crotalus t. terrificus*, *Bothrops neuwiedii meeridionalis* and the coral snake *Micrurus lemniscatus*.

ZONING: A national park zone and an intensive use zone.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Two staff units plus labour force were reported in 1966; no recent information.

BUDGET: Quoted in 1966/67 as US\$ 6,000; but no up-to-date figures available.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendente, Parque Nacional El Rey, Servicio Nacional de Parques Nacionales, Salta, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(12) Chaco National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 14 November 1954, by Law 14.366 (first measures in 1935).

GEOGRAPHICAL LOCATION: The park is in the Chaco province, in northern Argentina; 26°50'S, 59°40'W.

ALTITUDE: Not more than 200-300m.

AREA: 15,000 ha.

LAND TENURE: Government-owned.

PHYSICAL FEATURES: A plateau area with extensive savannas, humid forests and marshlands. There are areas of scenic interest with palm forests, and two lakes. Humid subtropical climate, with mean annual temperature of 22°C and with a mean annual precipitation of 400mm.

VEGETATION: Humid eastern 'chaqueno' type, with lush vegetation, and including areas of palms and of prairies. Principal species include the quebracho colorado *Schinopsis balansae*, mezquite species *Prosopis alba*, *P. nigra* and *P. kuntzei*, *Caesalpinia melanocarpa*, *Copernicia alba*, *Ruprechtia polystachya*, *Patagonia americana*, *Gleditsia amorphoides*, *Pisonia zapallo*, *Ziziphus mistoi*, *Cereus* spp., prickly pear *Opuntia* spp. and the epiphytic Spanish moss *Tillandsia* sp.

NOTEWORTHY FAUNA: Except for insects, animal life is generally poor due to past human interference. However, the mammals recorded do include the maned wolf *Chrysocyon brahcyurus* (V). Also found are the mouse opossum *Marmosa agilis*, skunk *Conepatus suffocans*, Azara's fox *Dusicyon gymnocercus*, Geoffroy's tiger cat *Felis geoffroyi* (V), tapir *Tapirus terrestris* and brocket deer *Mazama simplicornis* and *M. rufa*. Birds include greater rhea *Rhea americana*, spotted nothura *Nothura maculosa*, undulated tinamou *Crypturellus undulatus*, jabiru stork *Jabiru mycteria*, southern screamer *Chauna torquata*, dusky-legged guan *Penelope obscura* and Chaco chachalaca *Ortalis canicollis*.

ZONING: Not clearly defined, but includes a national park zone and an intensive use zone.

DISTURBANCES OR DEFICIENCIES: None currently reported, but illegal hunting has been reported in the past. The park was established to protect the 'red quebracho' *Schinopsis balansae* which was exploited for extraction of tannin. This area is now being reclaimed.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: No recent information, but two units were reported in c. 1966, supplemented by occasional visits of inspection by staff from other parks.

BUDGET: Quoted as US\$ 2,500 in 1966/67; no up-to-date figures available.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendente, Parque Nacional Chaco, Servicio Nacional de Parques Nacionales, Provincia de Chaco, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(13) Lago Puelo National Park and Reserve

MANAGEMENT CATEGORY: II & IV (National Park & Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.37.12 (Valdivian Forest/Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 16 February 1946 by Decree 4.822, and with modification 11 November 1971 by Law 19.292. First created in 1937 as an annexe of the Los Alerces National Park 40km to the south.

GEOGRAPHICAL LOCATION: Northwest sector of the province of Chubut, near El Solson and on the border with Chile; 42°10'S, 71°40'W.

ALTITUDE: 200-3100m.

AREA: National Park: 14,100 ha. National Reserve: 9,600 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Rugged mountain country, with sharp summits, glaciers, lakes and forests. Puelo River crosses the Andes and the lake eventually flows into the Pacific. Puelo Lake occupies one sixth of the total area.

VEGETATION: Mixed humid forests of several species of *Nothofagus* with alerce *Fitzroya cupressoides*, Chile cedar *Austrocedrus chilensis*, avellano *Eugenia* spp., urmo *Eucryphia cordifolia*, tique *Aetoxicum punctatum* and deu *Coriaria ruscifolia*.

NOTEWORTHY FAUNA: Mammals include Southern Andean huemul *Hippocamelus bisulcus* (E), pudu *Pudu pudu*, culpeo fox *Dusicyon culpaeus* and coypu *Myocastor coypus*. Among the birds are black-crowned night heron *Nycticorax nycticorax*, bicolored hawk *Accipiter bicolor*, chimango *Milvago chimango*, southern lapwing *Vanellus chilensis* and black-necked swan *Cygnus melancoriphus*.

ZONING: National Park and National Reserve. The Reserve is subdivided into two zones.

DISTURBANCES OR DEFICIENCIES: Slow recovery from old fire effects, which devastated large forested areas included today within both zones.

SCIENTIFIC RESEARCH: Flora inventory. Vertebrate inventory. Meteorological observations.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 2 rangers.

BUDGET: US\$ 146,622 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Parque Nacional Lago Puelo, Provincia del Chubut (under the Superintendent of Los Alerces National Park).

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(14) Lihuel Calel National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.25.7 (Monte).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 31 May 1977 by Decree 609.

GEOGRAPHICAL LOCATION: In the south of La Pampa province; 38°00'S, 65°30'W.

ALTITUDE: 600-750m.

AREA: 9,900 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Plains, with the low hill range of Lihué Calel which are of volcanic rocks of Precambrian origin. Slopes are gentle to the north, more abrupt to the south.

VEGETATION: Open low 'monte' scrub, the dominant species being jarilla or creosote bush *Larrea divaricata*, chanar *Geoffroea decorticans*, piquillin *Condalia microphylla*, una de gato *Cercidium australis* and a few calden *Prosopis caldenia*. Three species endemic to the sierra are cactus traicionero *Opuntia peulcheana*, *Gaillardia cabreræ* and *Adesmia lihuelensis*. The flora is more developed and richer than on the surrounding plains.

NOTEWORTHY FAUNA: Jaguarundi *Felis yagouaroundi* (I), pampas cat *Felis colocolo*, skunk *Conepatus chinga*, viscacha *Lagostomus maximus* and cavia *Micorcavia australis*. Among the birds are turkey vulture *Cathartes aura*, martineta, crested tinamou *Eudromia elegans*, aplomado falcon *Falco femoralis*, burrowing parrot *Cyanoliseus patagonus* and campo flicker *Colaptes campestris*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Cattle and goat used to graze on the hills. Wild boar *Sus scrofa* is the most important exotic species.

SCIENTIFIC RESEARCH: Flora inventory. Meteorological observations. The area is also of archaeological, ethnological and historical interest.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A ranger-in-charge and a labourer.

BUDGET: US\$ 131,860 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Parque Nacional Lihuel Calel-Lihué Calel, La Pampa, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(15) El Palmar National Park

MANAGEMENT CATEGORY: I & II (Strict Nature Reserve & National Park).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Argentinian Pampas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 28 January 1966 by Law 16.802. Also known as Palmar de Colon National Park.

GEOGRAPHICAL LOCATION: Entre Rios province, eastern Argentina, on the Rio Uruguay which forms the border with Uruguay; 32°30'S, 58°W.

ALTITUDE: 50-100m.

AREA: Park: 8,500 ha. Reserve: 5,500 ha.

LAND TENURE: No information.

PHYSICAL FEATURES: Undulating landscape with rocks, sandy areas, savannas and several rivers. There is a palm forest which is 200-800 years old. Archaeological remains include Indian tombs, pottery and bones. The climate is temperate subtropical, with a mean annual temperature of 18.6°C, and annual precipitation of 1181mm.

VEGETATION: There are extensive stands of palm *Butia yatay* which the reserve was created to protect. The flora is typical of that of the subtropical Misiones region, with gallery forests along the rivers which are rich in epiphytes, aquatic vegetation in the 'Bajos' and areas of xerophytic vegetation.

NOTEWORTHY FAUNA: The mammals include La Plata otter *Lutra platensis* (V), capybara *Hydrochoerus hydrochaeris* and coypu *Myocaster coypus bonariensis*, but none of these is as abundant as the viscacha *Lagostomus maximus* which is particularly common in this park. Among numerous birds are the greater rhea *Rhea americana albenscens*, pinnated bittern *Botaurus pinnatus*, wood stork *Mycteria americana*, maguari stork *Euxenura maguari*, buzzard eagle *Geranetus melanoleucus*, savanna hawk *Heterospizias meridionalis*, vermilion flycatcher *Pyrocephalus rubinus rubinus*, mocking bird *Mimus saturninus modulator*, solitary black cacique *Cacicus solitarius*, long-tailed meadow lark *Sturnella loyca*, red-breasted cardinal *Paroaria coronatus* and hooded siskin *Spinus magellanicus*. Correa Luna (1977) also recorded jaguar *Panthera onca* (V).

ZONING: Not clearly defined. They comprise a national park and a national reserve but not in the same way as in other Argentine parks where they form clearly demarcated zones. There are also intensive use zones.

TOURISM: An administrative centre, camp sites and sport-fishing are available.

DISTURBANCES OR DEFICIENCIES: Grazing by cattle has caused problems for palm regeneration in the past, and much of the area is affected by overgrazing. Under protection natural recovery is gradual.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: In 1972, soon after responsibility for the park had been taken over by the National Parks Department and it was still being organized, the personnel comprised a superintendent, three guards and auxiliary staff.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendencia, Parque y Reserva Nacional El Palmar, Servicio Nacional de Parques Nacionales, Provincia da Entre Rios, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(16) Laguna Blanca National Park and National Reserve

MANAGEMENT CATEGORY: II & IV (National Park and Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 31 May 1940, by Law 13.895 and Decree 63.691.

GEOGRAPHICAL LOCATION: Neuquén province, west central Argentina; 39°03'S, 70°20'W.

ALTITUDE: 1275-1725m.

AREA: National park: 8,250 ha. National reserve: 3,000 ha.

LAND TENURE: Mainly government owned.

PHYSICAL FEATURES: Typical treeless Patagonian steppe with crystalline rocks: granites, diorites, basalts, porphyrys and metamorphics. Some sedimentary rocks with fossils of the genera *Ostrea* and *Trigonia*. The park and reserve surround the Laguna Blanca at 1,267m, which is surrounded by some forest. The climate is dry, with no more than 200mm of rain a year, and the whole area is subject to strong winds from the west.

VEGETATION: Primarily xerophytic vegetation with grasses and dwarf shrubs. Species found within the park include *Mulinum spinosum*, *Chuquiranga argentea*, *C. aurea*, *Nassauvia glomerulosa*, *N. axillaris*, *Doniophyton patagonicum*, *Collignaja integerrima*, *Lycium ameghioni*, *Prosopis patagonica*, *Schinus polygamus* var. *patagonicus*, and grasses of the genera *Stipa*, *Poa*, and *Festuca*.

NOTEWORTHY FAUNA: This area is of particular interest for its avifauna, and was in fact established to protect the black-necked swan *Cygnus melanocoryphus* which is found here in great abundance. Other anatids found on the lake include the upland goose *Chloëphaga picta*, shoveler *Anas platalea*, crested duck *Lophonetta specularoides*, spectacled duck *A. specularis*, yellow-billed pintail *A. georgica*, rosy-billed pochard *Netta peposaca*, flying steamer duck *Tachyeres patachonicus* and blue-billed duck *Oxyura australis*. Other waterbirds include the grebes *Podiceps rolland chilensis*, *P. major*, *P. occipitalis*, and *Podilymbus podiceps antarcticus*, and the Andean flamingo *Phoenicopterus ruber chilensis*, while the wading birds include the two-banded plover *Charadrius falklandicus*, and the least seedsnipe *Thinocorus rumicivorus*. The area also has lesser rhea *Pterocnemis pennata*, black-crowned night heron *Nycticorax nycticorax obscurus*, parasitic jaeger *Stercorarius parasticius*, and two species of gull, *Larus maculipennis* and *L. dominicanus*. Mammals include the mouse opossum *Marmosa pallidior* and the skunk *Conepatus suffocans enuchus*.

ZONING: A national park zone and a national reserve zone.

DISTURBANCES OR DEFICIENCIES: There is a public road through the park along the lake shore.

SCIENTIFIC RESEARCH: Mainly on limnology, geology, vegetation, fauna and genetic studies.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Secretaria de Estado de Agricultura y Ganaderia de la Nacion (1968). Anales de Parques Nacionales 11(2a) (99-303) 104pp. Administracion Nacional de Parques Nacionales, Buenos Aires.

STAFF: 1 unit only in 1966; no further information.

BUDGET: US\$ 2200 in 1966/67; no recent figures.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendente, Parque Nacional Laguna Blanca, Servicio Nacional de Parques Nacionales, Provincia de Neuquén, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1975.

(17) Los Arrayanes National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.37.12 (Valdivian Forest/Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 October 1971 by Law 19.292.

GEOGRAPHICAL LOCATION: Southwestern sector of the province of Neuquén; 40°47'-52' L, 71°36'-40' W.

ALTITUDE: 720-820m.

AREA: 1,000 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Located on the Quettrihué Peninsula, Nahuel Huapi Lake. Fairly flat relief, with small elevations. Temperate-cold climate. Precipitation 1,300mm.

VEGETATION: A practically pure community of arrayan *Myrceugenella apiculata*, which creates a spectacular forest because of the shape and reddish colour of the bark. Some individuals are over 300 years old.

NOTEWORTHY FAUNA: Scarce. The species are the same found in the surrounding Nahuel Huapi National Park.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Excessive soil compaction by trampling of so many visitors affects germination and establishment of seedlings.

SCIENTIFIC RESEARCH: Flora inventory. Vertebrate inventory. Meteorological observations.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Direccion General de Parques Nacionales (1972). Parque Nacional Nahuel Huapi. Secretaria de Estado de Agricultura y Ganaderia de la Nacion, Sante Fe 690, Buenos Aires, 20pp.

STAFF: A ranger.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Superintendent of Nahuel Huapi National Park.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(1) Formosa Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1968, by Law 17,916.

GEOGRAPHICAL LOCATION: Northwest section of Formosa province on its southwestern border with Chaco province; 24°10'S, 62°00'W.

ALTITUDE: 50-70m.

AREA: 10,000 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Flat land, often flooded, with many lagoons, gullies and streams. The reserve is bounded to one side by the Teuco River, and to the other by the Teuquito River. Climate is semi-arid to subhumid in a neotropical-subtropical environment, with an annual average temperature of 22°C and annual average precipitation of 600mm.

VEGETATION: Subtropical xerophytic forests, dominated by *Schinopsis quebracho-colarado*, *Aspidosperma quebracho-blanco*, *Prosopis alba*, algarrobo *P. nigra*, palo blanco *Bulnesia sarmientoi*, guayacan *Caesalpinia paraguariensis* and *Acacia* spp. There is also a good shrub layer, and a number of grassland clearings.

NOTEWORTHY FAUNA: The noteworthy mammals include the maned wolf *Chrysocyon brachyurus* (V), giant armadillo *Priodontes giganteus* (V), giant anteater *Myrmecophaga tridactyla* (V), bush rabbit *Pediolagus salinicola*, viscacha *Lagostomus maximus*, skunk *Conepatus chinga* and the hairy armadillo *Chaetophractus vellerosus*. Birds include the cocoi heron *Ardea cocoi*, plumbeous ibis *Harpiprion caerulescens*, jabiru stork *Jabiru mycteria* and muscovy duck *Cairina moschata*. Correa Luna (1977) also records maned wolf *Chrysocyon brachyurus* (V) and the giant Brazilian otter *Pteronura braziliensis* (V), though the latter at least seems unlikely still to be found in the area (Thornback and Jenkins, 1982).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Some settlers who were there before the creation of the reserve. Lumbering, overgrazing, burning and poaching. The objective of establishing the reserve was recovery of the fauna, and protection of plant cover. This park has previously been reported as being in a very bad state (Schaller and Tarak, 1976).

SCIENTIFIC RESEARCH: Evaluation of bird populations in the forest understorey. Flora inventory. Meteorological observations.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Schaller, G.B. and A. Tarak. (1976). The Maned Wolf in Argentina. Part 1 of a report on a wildlife survey in Northern Argentina and in the Emas National Park, Brazil. Unpublished Report.

See also general reference list

STAFF: 2 rangers, 2 administrative staff and 2 labourers.

BUDGET: US\$ 32,560 in 1981 (salaries not included).

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Superintendent of the Parque Nacional El Rey.

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: June 1981.

(1) Laguna de Pozuelos National Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1981.

GEOGRAPHICAL LOCATION: In the northwest of Jujuy province; 22°15'-27'S, 65°56'-66°03'W.

ALTITUDE: 3,500-3,600m.

AREA: 28,000 ha.

LAND TENURE: Still privately owned, but due to be expropriated.

PHYSICAL FEATURES: A salt water lagoon which occupies a depression between the Sierras de Cochinoca and Rinconada. Soil around the lagoon is coarse. Climatic conditions are severe, aridity being high, and winds are strong and almost constant. Thermal amplitude is very great during the day.

VEGETATION: Open, low scrub, with a high percentage of barren ground. The main shrubs are *tola* *Parastrephis lepidophylla*, *P. phyllicaeformis*, *Fabiana densa* and *Adesmia* spp. There are abundant forms of cushion plants, the most striking and hardiest of all being yareta *Azorella compacta*. Tough grasses like *Stipa* spp. and *Festuca* spp.

NOTEWORTHY FAUNA: *Vicuna* *Vicugna vicugna* (V) is seen around the lagoon, but the main reason for the creation of the park is the protection of many bird species, especially waterfowl. There are some endemic species. Birds include greater flamingo *Phoenicopterus ruber*, Andean flamingo *Phoenicoparrus andinus*, puna flamingo *P. jamesi*, horned coot *Fulica cornuta* (R), giant coot *F. gigantea*, Andean goose *Chloephaga melanoptera* and Andean avocet *Recurvirostra andina*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Grazing and browsing around the lagoon has been severe, and the vegetation shows symptoms of deterioration.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Superintendent of the Parque Nacional El Rey.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(2) Petrified Forest National Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.26.8 (Patagonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 5 May 1954, by Decree 7252.

GEOGRAPHICAL LOCATION: Santa Cruz Province in Patagonia, southern Argentina; 47°45'S, 68°00'W.

ALTITUDE: Up to 400m.

AREA: 10,000 ha.

LAND TENURE: Government-owned land.

PHYSICAL FEATURES: Patagonian steppe, semi-arid area with petrified forest of pre-Andean age (possibly 140 million years old). The trees are a species of araucaria (*Araucaria mirabilis*) and are in part still standing due to petrification by volcanic ash. Some trees measure more than 100m in length and 3.5m in diameter. The forest is of particular interest because it provides evidence that the humidity of this area was much higher before the formation of the Andes chain.

VEGETATION: Typical xerophytic steppe vegetation, with stunted and spiny shrubs, and including *Caesalpinia gilliesi*, *Berberis cuneata*, *Anthrophyllum rigidum*, *Chiliotrichium anelloides*, *Mulinum spinosum*, *Arantholippia seriphioi* and *Fragaria chiloensis*.

NOTEWORTHY FAUNA: The presence of guanaco *Lama guanicoe* and of the lesser rhea *Pterocnemis pennata* has been recorded, as have the pichis *Zaedyus pichiy*, and two foxes, the culpeo fox *Dusicyon culpeus* and the Argentine grey fox *D. griseus* (Correa Luna, 1977).

ZONING: Presumably inapplicable.

DISTURBANCES OR DEFICIENCIES: None reported. The area is uninhabited and there is no tourist accommodation, although an administrative and visitors' information centre has been established.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: An officer-in-charge was appointed some years ago and he ran the visitors' centre. No recent information has been provided.

BUDGET: Quoted as US\$ 15,000 in 1966/67; up-to-date figures not available.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendente, Monumento Natural de Los Bosques Petrificados, Servicio Nacional de Parques Nacionales, Provincia de Santa Cruz, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1977.

(1) Right Whale Wildlife Sanctuary, Gulf of San José

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.25.7 (Monte).

LEGAL PROTECTION: Decree of the Chubut Provincial Legislature.

DATE ESTABLISHED: 5 December 1974.

GEOGRAPHICAL LOCATION: In the Gulf of San José, Chubut province on the Patagonian coast; 42°10'S, 64°46'W.

ALTITUDE: Sea level.

AREA: Not available, but certainly over 50,000 ha.

LAND TENURE: State owned.

PHYSICAL FEATURES: The reserve incorporates the waters of Golfo San José and a 100m strip of land

surrounding the gulf. The gulf is almost cut off from the sea by an arm of the Valdes Peninsula.

VEGETATION: The park is in a region of thorn scrub.

NOTEWORTHY FAUNA: The reserve protects the breeding, calving and mating areas of the right whale *Balaena glacialis* as well as the orca or killer whale *Orcinus orca*, elephant seals and other marine mammals and birds in the area. The breeding season for right whales is from September to April.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: The current management does not include adequate regulations for effective control. Tourism and boating activities are allowed and are a noted source of concern for management.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: IUCN (1977). Proceedings of the Workshop on Cetacean Sanctuaries held at Tijuana and Guerrero Negro B.C. Mexico, February 1979, under the auspices of IUCN, UNEP and WWF (Project No. 1405).

Other project reports for IUCN/WWF Project 1405.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Government of Chubut Province, Casa de la Gobernacion, Av. da Fontaine 50, Rawson, Chubut, Argentina.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: 1979.

(1) San Guillermo Biosphere Reserve

MANAGEMENT CATEGORY: II & IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.37.12 (Southern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Decree 2,164 of 22 June 1972, Decree 1,302 of 13 April 1973, Decree 3,376 of 1976, all from the Province of San Juan. Established as a Biosphere Reserve in 1980.

GEOGRAPHICAL LOCATION: The northwest sector of the San Juan province, western central Argentina, on the Cordillera de San Guillermo; 29°30'S, 69°00'W.

ALTITUDE: 1,000-6,000m.

AREA: 981,000 ha, with a core zone of 42,000 ha.

LAND TENURE: Owned by the province.

PHYSICAL FEATURES: An arid range of mountain ridges and valleys close to the main chain of the Andes. There are no permanent surface watercourses. Soils are coarse. The climate is temperate in the foothills and very cold at higher elevations, with snowfalls. It is also very windy.

VEGETATION: Open canopy of short and cushion shrubs, leaving a great proportion of exposed ground. Coarse grasses are present. Among the shrubs are species of *Adesmia*, *Patrastrephia*, *Fabiana*, *Azorella* and *Ephedra*. Among the herbaceous vegetation, species of *Astragalus*, *Tropoelium*, *Glandularia*, *Phacelia*, *Stipa*, *Festuca* and *Deyeuxia*. In the best conditions of soil and humidity, grassy steppes can be found, especially above 3,500m.

NOTEWORTHY FAUNA: Protection of the vicuna *Vicugna vicugna* (V) is the main reason for the

creation of this reserve. Its isolation and the shortage of water has prevented hunters from getting into the area too often, so many vicuna herds can be found. Guanaco *Lama guanicoe* is also present in sizeable herds. Condor *Vultur gryphus* and other birds of prey, lesser rhea *Pterocnemia pennata*, and wild geese and ducks (Anatidae) can be seen. Foxes, various rodents (including *Lagidium viscaia* and *Chinchilla brevicaudata*) and mountain lion *Felis concolor* are also present in the reserve.

ZONING: The core zone of 42,000 ha is strictly protected, while the remaining area corresponds to the manipulative and buffer zones.

DISTURBANCES OR DEFICIENCIES: Until recently some hunting took place in the southeastern portion of the reserve.

SCIENTIFIC RESEARCH: Global survey at a scale of 1:250,000, with maps. Ecological survey of a pilot area, at a scale of 1:50,000. Studies on niche and behaviour of camelids.

SPECIAL SCIENTIFIC FACILITIES: Buildings for lodgings and research are being constructed.

PRINCIPAL REFERENCE MATERIAL: Various reports and projects on the area.

STAFF: An administrator, 2 technicians, 8 rangers, and a driver. 5 scientists cooperate, but on a temporary basis.

BUDGET: Unknown.

LOCAL PARK OR RESERVE ADMINISTRATION: Jointly run by the Secretaria de Agricultura y Ganaderia de San Juan, the Subsecretaria de Recursos Naturales Renovables y Ecologia Nacional, and the Subsecretaria y Direccion de Ordenamiento Ambiental Nacional.

NAME OF CNPPA COORDINATOR: Ricardo Luti.

INFORMATION DATED: June 1981.

(1) Laguna Blanca Provincial Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Partial.

DATE ESTABLISHED: 16 March 1979, by Decree E-No. 475.

GEOGRAPHICAL LOCATION: Department of Belén, Catamarca province; 26°30'-27°00'S, 66°30'-67°30'W.

ALTITUDE: 3,200-5,500m.

AREA: 770,000 ha.

LAND TENURE: Only 70 ha are owned by the government, and a high altitude experiment station and Rangers' Headquarters are being built there. The rest of the area is privately owned.

PHYSICAL FEATURES: A high plateau of the 'Puna' region, with a salty lagoon in the main depression. It is completely surrounded by mountain ranges. There are permanent streams, most of them freshwater, coming from the melting of ice and snow on the higher peaks. The climate is cold, arid and windy, with great daily variation in temperature.

VEGETATION: Very open short shrub communities. Species of *Adesmia*, *Fabiana*, *Parastrephia*, *Tetraglochin* and *Neospartum*, and tough grasses such as *Festuca*, *Stipa*, *Deyeuxia* and *Sporobolus*.

NOTEWORTHY FAUNA: Vicuna *Vicugna vicugna* (V) in many herds totalling some 900 animals. Foxes, chinchillones and other rodents, mountain lion *Felis concolor*, *Rhea* sp., Andean condors *Vultur gryphus* and other vultures (Cathartidae), other birds of prey, flamingos (Phoenicopteridae) and ducks (Anatidae) are present.

ZONING: Zoning will soon be implemented, based on vegetation patterns and composition.

DISTURBANCES OR DEFICIENCIES: A deal with the settlers who own the land is under way. An agreement to stop hunting and chasing vicunas was made over a year ago and the vicunas are a little more tame now. Sheep, cattle and llamas graze and browse heavily, and there are hundreds of semi-wild donkeys. Management techniques are being introduced in order to make the different uses compatible.

SCIENTIFIC RESEARCH: Plant and wildlife inventory. Behaviour of vicuna. Zonification and state of vegetation for management planning. Meteorological observations. Soil studies.

SPECIAL SCIENTIFIC FACILITIES: A section of the building now under construction will provide limited facilities soon.

PRINCIPAL REFERENCE MATERIAL: Reports and projects on the area. Personal communications. Direct observations.

STAFF: A technician in charge, 2 assistants and 6 workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion de Ganaderia de la Provincia de Catamarca, 4700 Catamarca, Argentina.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

BAHAMAS

AREA: 11,406 sq km.

POPULATION: 225,000 (1978).

PARKS AND RESERVES LEGISLATION: Bahamas National Trust Act 1959/1965.

PARKS AND RESERVES ADMINISTRATION: Parks and Reserves are run under the auspices of the Bahamas National Trust.

ADDRESS: Bahamas National Trust, PO Box N4105, Nassau, New Providence, Bahamas.

TOTAL AREA UNDER PROTECTION: 121,910 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Inagua	74,333
2 Exuma Cays	45,584
3 Peterson Cay*	1.62
Managed Nature Reserves	
1 Union Creek	1,183
2 Conception Island	810

* This area is not included in **TOTAL AREA UNDER PROTECTION**.

(1) Inagua National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.38.13 (Bahaman-Bermudan).

LEGAL PROTECTION: Total, under the National Trust Act.

DATE ESTABLISHED: April 1965.

GEOGRAPHICAL LOCATION: Inagua Island; 20°55'-21°15'N, 73°37'-73°10'W.

ALTITUDE: -1m to 28m.

AREA: 74,333 ha.

LAND TENURE: Leased from Crown until 2062.

PHYSICAL FEATURES: Primarily saline marsh and seasonally flooded salinas. A few small hills with stunted xerophytic coppice. Coral reefs and mangroves to the northwest.

VEGETATION: Mainly buttonwood *Conocarpus erectus* and black mangrove *Avicennia germinans* in flooded areas. Higher ground has mixed broadleaf coppice, Inagua oak *Buceda buceras*, poisonwood *Metopium toxiferum*, lignum vitae *Guaiacum sanctum* and gumbo limbo *Bursera simaruba*.

NOTEWORTHY FAUNA: There are about 40,000 flamingos *Phoenicopterus ruber*, 50 pairs of spoonbills *Platalea ajaja*, 200 pairs of reddish-egrets *Dichromanassa rufescens* and approximately 500 pairs of parrots *Amazona leucochala bahamensis*. *Chrysemis malonei* is an endemic turtle.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Some illegal poaching of flamingos and other bird species by locals, but this is mostly controlled by the wardens.

SCIENTIFIC RESEARCH: Ongoing and long-term research into the biology and ecology of the West Indian flamingo by Alexander Sprunt IV, Research Director of the National Audubon Society.

SPECIAL SCIENTIFIC FACILITIES: One or two four-wheel drive vehicles; the Arthur Vernay Camp, which houses six.

PRINCIPAL REFERENCE MATERIAL: Allen, R. P., Monograph on Flamingos, National Audubon Society, New York.

Campbell, David G. (1979). The Ephemeral Islands, Macmillan, London.

Klingel. The Ocean Isle, also titled in new editions, Inagua.

STAFF: Two Bahamas National Trust Wardens, Sam and Jim Nixon, who are residents of Mathewtown, Inagua.

BUDGET: About \$25,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Administered by the Bahamas National Trust, PO Box N4105, Nassau, Bahamas.

NAME OF CNPPA COORDINATOR: Allen D. Putney/David G. Campbell

INFORMATION DATED: 28 June 1979.

(2) Exuma Cays Land-and-Sea Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.38.13 (Bahaman-Bermudan).

LEGAL PROTECTION: Total, under the National Trust Act.

- DATE ESTABLISHED:** July 1958.
- GEOGRAPHICAL LOCATION:** Those Exuma Cays between Shroud Cay (in the north) to Bell Island (in the south); 24°34'-27'N, 76°33'-45'W.
- ALTITUDE:** Below sea level to several tens of metres above sea level.
- AREA:** 45,584 ha.
- LAND TENURE:** 99 year Crown Lease, with the exceptions of Bell Island, Little Bell Cay, Cistern Cay and Hall's Pond Cay, which are privately owned or leased.
- PHYSICAL FEATURES:** Aeolian islands of Pleistocene origin; shallow calcium carbonate banks and extensive coral reefs.
- VEGETATION:** Mangrove communities. The eastern sides of the cays are characterized by low canopy scrub dominated by *Bumelia*, *Coccolobis* spp. and *Rachicallis*; the western (leeward) sides of the islands have single canopied (5m) forest, dominated by *Thrinax*, *Sabal* and *Bursera*, high densities of epiphytic orchids such as *Epidendrum* spp. and bromeliads such as *Tillandsia* spp. and typical North Bahamas strand communities characterized by *Uniola*, *Strumfia* and *Scaveola*. Sargent's palm *Pseudophoenix sargentii* is noteworthy.
- NOTEWORTHY FAUNA:** The threatened Allen's Cay rock iguana *Cyclura cyclura inornata* is found close to, but not actually within, the park. There are numerous fish and coelenterates, as well as coral reefs. The rare Bahamian hutia *Geocapromys ingrahami* was introduced into the park in 1973, and there were reported sightings in 1978.
- ZONING:** No information.
- DISTURBANCES OR DEFICIENCIES:** Illegal hunting of iguanas by yachtsmen; illegal commercial fishing activities, including the use of chlorine bleach in spearfishing, a practice which disrupts the entire reef biota. Probable coral reef damage due to diving.
- SCIENTIFIC RESEARCH:** None.
- SPECIAL SCIENTIFIC FACILITIES:** None.
- PRINCIPAL REFERENCE MATERIAL:** Report of the Exuma Cays Park Project (revised edition of 1961) ed. by Carleton Ray, available from the Bahamas National Trust, 39pp.
- STAFF:** Honorary Wardens, based in Nassau.
- BUDGET:** No information.
- LOCAL PARK OR RESERVE ADMINISTRATION:** Administered by the Bahamas National Trust, PO Box N4105, Nassau, Bahamas.
- NAME OF CNPPA COORDINATOR:** Allen D. Putney/David G. Campbell.
- INFORMATION DATED:** 28 June 1979.

(3) Peterson Cay Land-and-Sea Park

- MANAGEMENT CATEGORY:** II (National Park).
- BIOGEOGRAPHICAL PROVINCE:** 8.38.13 (Bahaman-Bermudan).
- LEGAL PROTECTION:** Total.
- DATE ESTABLISHED:** Unknown.
- GEOGRAPHICAL LOCATION:** An offshore cay several miles east of Freeport/Lucaya, Grand Bahama Island.
- ALTITUDE:** Below sea level to less than 5m above sea level.

AREA: 1.62 ha.

LAND TENURE: Crown Lease.

PHYSICAL FEATURES: A low-lying aeolian cay of Pleistocene origin, with coral reefs.

VEGETATION: Entirely strand vegetation.

NOTEWORTHY FAUNA: None.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Tourist Scuba divers and yachtsmen. There is no effective enforcement of by-laws.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Contact Underwater Explorers Society, Freeport, Grand Bahama Island.

STAFF: None.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Bahamas National Trust, PO Box N4105, Nassau, Bahamas.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 28 June 1979.

(1) Union Creek

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.38.13 (Bahaman-Bermudan).

LEGAL PROTECTION: Presumably under the National Trust Act.

DATE ESTABLISHED: April 1965.

GEOGRAPHICAL LOCATION: Northwest Inagua Island; 21°7'-9'N, 73°32'-37'W.

ALTITUDE: Around sea level.

AREA: 1,813 ha.

LAND TENURE: Crown Lease, expires 2062.

PHYSICAL FEATURES: A mangrove-fringed extension of the ocean, walled off from the sea by cyclone and rock fencing.

VEGETATION: Predominantly red mangroves *Rhizophora mangle* and turtle grass beds *Thalassia testudinum*.

NOTEWORTHY FAUNA: Captive green turtle *Chelonia mydas* (E) and loggerheads *Caretta caretta* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Occasional poaching of sea turtles by locals and Dominican sailors.

SCIENTIFIC RESEARCH: The Caribbean Conservation Corporation has supported research in green turtle physiology and ecology, most recently with the work of Karen Bjorndal, (PhD, University of Florida 1978).

SPECIAL SCIENTIFIC FACILITIES: The New York Zoological Society has refurbished a crude house.

PRINCIPAL REFERENCE MATERIAL: Consult Archie Carr, Florida University.

STAFF: Inagua Park Wardens Sam and Jim Nixon oversee Union Creek.

BUDGET: Partly derived from the Inagua Park budget; CCC has offered some warden support when a researcher is on the premises and to maintain the fence and wall.

LOCAL PARK OR RESERVE ADMINISTRATION: Bahamas National Trust, PO Box N4105, Nassau, Bahamas.

NAME OF CNPPA COORDINATOR : Allen D. Putney/David G. Campbell.

INFORMATION DATED: 28 June 1979.

(2) Conception Island

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.38.13 (Bahaman-Bermudan).

LEGAL PROTECTION: Total. The whole island is protected.

DATE ESTABLISHED: Unknown.

GEOGRAPHICAL LOCATION: Located between Cat Island and Rum Cay; 23°48'-52'N, 75°5'-8'W.

ALTITUDE: Sea level to less than 20m.

AREA: 810 ha.

LAND TENURE: Short-term Crown lease, renewable.

PHYSICAL FEATURES.: Low-lying aeolian island of Pleistocene origin.

VEGETATION: Extensive mangrove environments; strand vegetation.

NOTEWORTHY FAUNA: Conception Island may be one of the major green turtle *Chelonia mydas* (E) nesting areas in the Bahamas. It is also an important stop for migrating birds.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Few, if any.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: None.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Bahamas National Trust, PO Box N4105, Nassau, Bahamas.

NAME OF CNPPA COORDINATOR: Allen D. Putney/David G. Campbell.

INFORMATION DATED: 28 June 1979.

BARBADOS

AREA: 430 sq km.

POPULATION: 252,000 (1978).

PARKS AND RESERVES LEGISLATION: The Marine Areas (Preservation and Enhancement) Act of 1 March 1976, and presumably also the Barbados National Trust Act.

PARKS AND RESERVES ADMINISTRATION: The Parks and Beaches Commission, established under the Parks and Beaches Commission Act of 31 March 1970. The Commission is also responsible for a number of parks and beaches which do not meet the normal requirements of national park or protected area.

ADDRESS: Parks and Beaches Commission, Government Headquarters, Bridgetown, Barbados, West Indies.

TOTAL AREA UNDER PROTECTION: 250 ha.

PROTECTED AREAS:

Marine Park	(hectares)
1 Northeast Coast (proposed)	5,000
Marine Reserve	
1 Barbados	250

(1) Barbados Marine Reserve

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 November 1980.

GEOGRAPHICAL LOCATION: West coast of Barbados, between Sandy Bay and Heron Bay, extending 1km offshore; 13°10'N, 59°40'W.

ALTITUDE: -50 to 0m.

AREA: 250 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: The area is dominated by two nearshore fringing reefs isolated by sandy bays on either side, a bar reef 600m offshore, and a recently sunken freighter lying in 120' of water about half a mile offshore. The shore is characterized by sandy beaches. The terrestrial section is primarily a park area with beach and picnic facilities.

VEGETATION: Marine vegetation consists of 10-20 species of near-shore and encrusting coralline algae. The beach contains coconut *Cocos nucifera*, almond, Caribbean cherry, mahogany *Swietenia* sp., Australian pine and ornamental shrubbery.

NOTEWORTHY FAUNA: Varied population of sponges, anemones, polychaetes, sea urchins and sea cucumbers, 35 species of coral, 400 species of reef fish, and 3 species of marine turtles (all of which are threatened).

ZONING: The MV Stauronikita, an artificial reef; the underwater park with a scientific zone; a recreational zone (snorkeling, diving); two watersports zones (sailing, skiing, etc.); and the marine museum.

DISTURBANCES OR DEFICIENCIES: Freshwater outflow from Hometown River; 100m jetty causing beach erosion; difficulty in enforcement of laws. High tourist pressure.

SCIENTIFIC RESEARCH: Hurricane damage assessment; population dynamics; deep water sediments; marine pollution surveys carried out by students at Bellairs Research Institute of McGill University.

SPECIAL SCIENTIFIC FACILITIES: Bellairs Research Institute of McGill University offers good laboratory and living accommodation, reference library, darkroom, scuba equipment, small boats and a 54' research vessel. The University of the West Indies Ave Hill Campus offers facilities and the reserve has its own equipment and facilities but a supervisor/biologist is needed. Marine museum contains marine aquaria and slide shows.

PRINCIPAL REFERENCE MATERIAL: CCA (1979). Management Proposal for Buccoo Reef.

Henry, Dr Alan. Reef fishes and corals. Royal Ontario Museum, Ontario, Canada.

IUCN (1976). An International Conference on Marine Parks and Reserves. IUCN Publications New Series No. 37, IUCN, Gland.

Ray (1975). Critical Marine Habitats.

Numerous taxonomic references.

STAFF: One park supervisor/marine biologist; three park naturalists; six sea rangers; two lifeguards; and two secretaries/receptionists.

BUDGET: 1980-81: 170,000 BF including building renovations, carpentry and opening costs and salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Parks and Beaches Commission, Ministry of Housing, Lands and Environment.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 6 October 1981.

BELIZE

AREA: 22,965 sq km.

POPULATION: 149,000 (1979).

PARKS AND RESERVES LEGISLATION: No national parks or equivalent reserves legislation exists at present. However, a UN consultant recently made a survey of the country with a view to recommending areas to be set aside as national parks and reserves, and legislation is expected to follow. Under the Crown Lands Ordinance (Chapter 110 of the Laws of Belize, Revised Edition 1958, Section 6) the Minister of Agriculture and Lands has the power to reserve from sale or lease parcels of land (national) for special purposes. Forest Reserves for the protection of national forests are created by the Minister of Trade and Industry, by virtue of Chapter 115 of the Laws of Belize, Revised Edition 1958, Section 3. Fisheries and marine resources protection ordinances and areas are also created by the Minister of Trade and Industry. Various forestry, fisheries and wildlife protection laws exist.

PARKS AND RESERVES ADMINISTRATION: Responsibility for the administration of forest reserves rests with the Chief Forest Officer. Responsibility for the administration of marine resources rests with the Fisheries Administrator. The Commissioner of Lands has delegated administrative responsibility for nine Crown Reserves to the Belize Audubon Society.

ADDRESS:

- (a) Commissioner of Lands, Ministry of Agriculture and Lands, Belmopan, Belize.
- (b) Chief Forest Officer, Ministry of Trade and Industry, Belmopan, Belize.
- (c) Fisheries Administrator, Ministry of Trade and Industry, PO Box 148, Belize City, Belize.
- (d) Belize Audubon Society, PO Box 6, Belize City, Belize.

TOTAL AREA UNDER PROTECTION: 4169.8 ha.

PROTECTED AREAS:

Natural Monument	(hectares)
1 Half Moon Caye	4,144
Crown Reserves	
1 Guanacaste Park	21.0
2 Little Guana Caye	1.6
3 Small Mangrove Caye	0.8
4 Doubloon Bank Caye	0.8
5 Bird Caye	0.8
6 Man-o-War Caye	0.8
7 Small Mangrove Caye	0.4
8 Small Mangrove Caye	0.4

There are also 10 Forest Reserves with a total area of 418,994 ha.

(1) Half-Moon Caye Natural Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: The island was established as a Crown Reserve Bird Sanctuary in 1928 and 1978, by government decree; declared officially as a Natural Monument with a much larger area in February 1982.

GEOGRAPHICAL LOCATION: The southeastern part of Lighthouse Reef (one of only three or four true coral atolls in the Caribbean/Atlantic); 17°13'N, 87°31'W.

ALTITUDE: From below sea level to 1.5m.

AREA: 4,144 ha.

LAND TENURE: All national land.

PHYSICAL FEATURES: A small coral sand caye with accumulations of coral rock rubble, less than 40 acres in size. There is a government lighthouse on the eastern end. Offshore are some beautiful, very high quality coral barrier reefs, with a sea wall and shallow coral gardens, and there are also areas of sand flats.

VEGETATION: There are coconut palms *Cocos nucifera* along the beach and near the lighthouse on the eastern end. The principal tree utilized as a nest support for the red-footed boobies is *Cordia sebestena*, but *Bursera simaruba* and *Bumelia retusa* are also employed. The western end of the caye is dominated by those trees and shrubs.

NOTEWORTHY FAUNA: The white phase of the red-footed booby *Sula sula* have nested here in thousands for over a hundred years (the current estimate is of 3,000-3,500 individuals). Magnificent frigatebirds *Fregata magnificens* also nest in good numbers. The nearby reefs and subtidal and intertidal zones are very rich in marine species. Green turtles *Chelonia mydas* (E) also nest on the beaches of the Caye.

ZONING: None *per se*; however the booby colony itself has a trail leading to it and a small observation platform which visitors are supposed to use. A management plan is being prepared (1981).

DISTURBANCES OR DEFICIENCIES: Raiding of the nesting colony for young birds and eggs by local fishermen. Uncontrolled selective collection of aquarium fish and ornamental molluscs from reef. Inadequately managed artisanal fisheries (conch and spiny lobster). Uncontrolled foreign-capital tourism threatening reefs and boobies was eliminated in 1979. The lighthouse area is not a problem.

SCIENTIFIC RESEARCH: None *per se*; however an extensive ecological research (marine) programme is underway on Carrie Bow Caye by the Smithsonian Institution (1975-present).

SPECIAL SCIENTIFIC FACILITIES: None, but scientists could share the lighthouse keepers' quarters for short periods.

PRINCIPAL REFERENCE MATERIAL: Ruetzler, K. (1975, 1976, 1977, 1978). Progress Reports: investigations of marine shallow water ecosystems: coral reef project, Carrie Bow Caye, Belize. Smithsonian Inst., Washington DC, Belize Audubon Society.

1978, 1979, personal communications.

STAFF: Three lighthouse keepers are acting as wardens for both land and marine areas, under new government decrees.

BUDGET: Approximately US\$ 20,000 for 1979-82, US\$ 14,000 from WWF and other organisations and the remainder from the Government of Belize.

LOCAL PARK OR RESERVE ADMINISTRATION: Fisheries Dept. and Belize Audubon Society, Belize City, Belize.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981 (with additions 24 February 1982).

(1) Guanacaste Park (Bird Sanctuary)

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: None yet.

DATE ESTABLISHED: 15 September 1975 by Government Decree.

GEOGRAPHICAL LOCATION: Central Belize; 17°15'N, 88°44'W.

ALTITUDE: Approximately 50m.

AREA: 21 ha.

LAND TENURE: On a conditional free grant to the Belize Audubon Society (to be kept solely as a bird sanctuary).

PHYSICAL FEATURES: Located at the confluence of the Belize River and its tributary Roaring Creek and bounded on the south by the Western Highway. Alluvial soils and limestone, with rainfall about 2,500-3,000mm per year.

VEGETATION: The main feature is a huge *Enterolobium cyclocarpum* which is very old and which escaped being made into a dugout canoe by the fact that it split and formed two trunks. This tree supports more than 35 different species of aerial plants, including a dozen species of orchids, several species of ferns, bromeliads, cacti and aroids. Other flora include *Syngonium* sp., *Heliconia* sp., *Cecropia* sp., *Axonopus* sp., *Cedrela mexicana*, *Acrocomia mexicana*, *Colocarpum mammosum*, *Orbignya cohune*, *Ceiba pentandra*.

NOTEWORTHY FAUNA: Birds include the blue-gray, golden-masked, gray-headed, scarlet-rumped and crimson-collared tanagers (*Thraupis episcopus*, *Tangara larvata*, *Eucometis penicillata*, *Ramphocelus passerinii*, *R. sanguinolenta*), several species of orioles (Icteridae) and hummingbirds (Trochilidae), black-faced ant thrush, green jay *Cyanocorax yncas*, lineated, golden-fronted, black-cheeked, smokey-brown and golden-olive woodpeckers (*Dryocopus lineatus*, *Melanerpes aurifrons*, *M. pucherani*, *Venilicornis fumigatus*, *Piculus rubiginosus*) and lesser swallow-tailed swift *Panyptila cayennensis* (nesting). Also present are iguanas and many species of butterflies and moths (Lepidoptera).

ZONING: None yet applied; the sanctuary has been fenced completely and has a nature trail, principally for bird-watching.

DISTURBANCES OR DEFICIENCIES: The area was partially disturbed in the distant past by selective logging, but is now fully protected.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Belize Audubon Society (1978-79). Personal communication.

STAFF: None; Belize Audubon Society members visit frequently to maintain area.

BUDGET: A few hundred dollars per year for basic maintenance.

LOCAL PARK OR RESERVE ADMINISTRATION: Belize Audubon Society, PO Box 6, Belize City, Belize.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

Crown Reserves

Little Guana Caye	1.6 ha
Small Mangrove Caye	0.8 ha
Doubloon Bank Caye	0.8 ha
Bird Caye	0.8 ha
Man-o-War Caye	0.8 ha
Small Mangrove Caye	0.4 ha
Small Mangrove Caye	0.4 ha

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: 6 September 1977, by Government Decree.

GEOGRAPHICAL LOCATION: Coastal Belize.

ALTITUDE: Sea level to 2m at the most.

AREA: See above.

LAND TENURE: All comprise national land managed by the Belize Audubon Society as Bird Sanctuaries (management responsibility having been vested in the Society by Government Decree).

PHYSICAL FEATURES: All are small mangrove islands, three in island lagoons, and one (Little Guana Caye) with a coral sand beach. Man-o-War Caye is on a patch reef.

VEGETATION: Mostly red mangrove *Rhizophora mangle*, though *Avicennia nitida* and *Laguncularia racemosa* are also found, as are coconut trees *Cocos nucifera*.

NOTEWORTHY FAUNA: All the sanctuaries are nesting and roosting sites for wading birds, though the species vary. The roseate spoonbill *Platalea ajaja* nests on the small unnamed reserve in northern Belize, but unfortunately has moved away from several of the others because of disturbance by hunters in the park. Doubloon Bank Caye is primarily a nesting site for storks *Mycteria americana*, but other birds are found including great egrets *Egretta alba* (which also nest on the unnamed Mangrove Caye), neotropical cormorants *Phalacrocorax olivaceous*, boat-billed heron *Cochlearius cochlearius*, anhinga *Anghinga anghinga* and cattle egret *Bubulcus ibis*. Bird Caye has all these species, and the white ibis *Eudocimus albus*. Little Guana Caye is the only place in the country where white ibis *Eudocimus albus*, reddish egret *Dichromanassa rufescens* and tri-coloured heron *Hydranassa tricolor* nest together, and the largest colony of reddish egrets in the Caribbean. The Man-o-war Caye is rather different, having nesting sites for brown booby *Sula leucogaster* (the only site in Belize), white-crowned pigeons *Columba leucocephala* and magnificent frigatebirds *Fregata magnificens*.

ZONING: Each of the sites is managed as a bird sanctuary, but there is no internal zoning.

DISTURBANCES OR DEFICIENCIES: Occasional illegal hunting for birds' feathers and/or eggs.

SCIENTIFIC RESEARCH: None *per se*; the Belize Audubon Society does at least once-yearly inspections of the area, sometimes including bird counts.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Belize Audubon Society (1979). Personal communication to C. MacFarland.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Belize Audubon Society, PO Box 6, Belize City, Belize.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

BERMUDA (UK)

AREA: 55 sq km.

POPULATION: 57,000 (1978).

We have no information on the current situation in Bermuda. Ray and McCormick in their Critical Marine Habitats Survey (IUCN/WWF Project 1037) mentioned two Coral Reef Preserves under Governmental control, with protection from fishing, collection and damage. There is a Bermuda National Trust Act (1969) which was amended in 1970.

BOLIVIA

AREA: 1,098,575 sq km.

POPULATION: 6,456,000 (1980).

PARKS AND RESERVES LEGISLATION: Decree Law 12301 of 14 March 1975 (Wildlife National Parks, Hunting and Fishing Law) deals with the establishment of national parks and other protected areas, as well as with the protection, management and utilisation of wildlife in general. It has been noted, however, that the regulations had still not come into force in 1980. In 1977 the law was such that regulations could be published specifically for each protected area.

PARKS AND RESERVES ADMINISTRATION: The protected areas system is the responsibility of the National Headquarters of Wildlife, National Parks, Hunting and Fishing, in the Centre of Forest Development of the Ministry responsible for agriculture and other rural affairs (in La Paz) and its eight regional departments. National Parks and Wildlife Reserves are sites necessary for the preservation, protection and management of wild animal populations to ensure their conservation. Wildlife Refuges and Sanctuaries would appear to be more closely geared to protecting particular species, resident or migratory, which scientific studies have shown to be in danger of extinction.

ADDRESS: Jefatura Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca, Centro de Desarrollo Forestal, Ministerio de Asuntos Campesinos y Agropecuarios, Avénide Camacho 1312 4to. Piso o Casilla 8124 - La Paz - Bolivia.

REFERENCES: Jungius, H. and R. Pujol, (1970). Bolivia National Parks and Reserves. UNESCO. Paris.

TOTAL AREA UNDER PROTECTION: 4,350,783 ha.

PROTECTED AREAS:

National Parks		(hectares)
1	Isiboro Secure	1,233,000
2	Huanchaca	541,200
3	Bellavista	90,000
4	Cerro Sajama	29,940
5	Condoriri	14,828
6	Las Barrancas*	347
7	Mallasa*	74
8	Cerro Comanche*	47
9	Cerro Mirikiri	Unknown
10	Tunari	Unknown
Nature Reserves		
1	Manuripi Heath	1,884,375
2	Eduardo Avaroa	400,000
3	Ulla Ulla**	137,800
4	German Busch	98,640
5	Lagunas del Beni y Pando	Unknown
Forest Refuge		
1	Huancaroma	11,000
Fiscal Reserves		
1	Cerro Tapilla	Unknown
2	Lagunas Alalay y Angostura	Unknown

Biosphere Reserves

- | | |
|---------------|-----------|
| 1 Ulla Ulla** | (200,000) |
| 2 Pilon-Lajas | (100,000) |

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.

** There are sheets for both the Biosphere Reserve, and the National Reserve.



(1) Isiboro-Sécure National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Para defender las cuencas hidrógraficas y la integridad de los recursos naturales renovables y las bellezas escénicas. No hay menciones especiales a la flora y fauna.

DATE ESTABLISHED: 22 noviembre 1965 (Decreto Ley 07401).

GEOGRAPHICAL LOCATION: Centro de Bolivia. Departamentos de Beni y Cochabamba; 65°09' a 66°55'W y 15°33' a 16°48'S.

ALTITUDE: 3,600 a 300 m.s.n.m.

AREA: 1,233,000 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Vertientes orientales de los Andes hasta los llaños beniaños. Fisiografía muy compleja propia de la transición entre la ceja de selva y los llaños. Paisajes ondulados, laderas empinadas, valles profundos, fajas de savanas, áreas pantañosas.

VEGETATION: 1.1.1.2. *Montane/submontane rain forest* con pequeñas savanas, el nivel intermedio es de vegetación lujuriente es más bien 1.1.1.4 *Cloud Forest*. El nivel inferior es muy rico en especies y se caracteriza por la abundancia de palmás (*Iriartea*). Luego viene una zona de transición entre el bosque y la savana no muy conocida. En las partes más bajas se encuentra 5.1.1.5. *Flood savanna* con árboles aislados tales como *Tabebuia* y *Jacaranda*. A lo largo de los ríos se presenta 1.1.1.5. *Riverine forest* con palmás y otros árboles similares a los de las partes bajas de 1.1.1.2. Aproximadamente 2/3 del área corresponden al bosque montano/submontano y 1/3 a las savanas.

NOTEWORTHY FAUNA: Aves Psittacidos: *Ara* spp., *Amazona*; Rhampastidos; Cracidos: *Penelope* spp., *Crax fasciolata*, *Pauxi unicornis* similar a *Mitu mitu*; *Sarcoramphus papa*; *Coragyps atratus*. En las partes bajas en ríos o lagunas: *Phalacrocorax brasilianus*, *Anhinga anhinga*, *Chloroceryle amazona*, *Ceryle torquata*; *Sterna supercilialis*, *Rynchops nigra*; *Casmerodius albus egretta*, *Leucophox thula*, *Ardea cocoi*; *Jabiru mycteria*; *Platalea ajaja*, *Cairina moschata*, *Neochen jubata*, etc. etc. Entre los mamíferos: *Chironectes*, *Marmosa*; Primates como: *Aotus trivirgatus*, *Cebus*, *Saimiri*, *Ateles paniscus* (V), *Alouatta* etc. Roedores: *Mesomys*, *Dasyprocta*, *Cuniculus paca*, *Hydrochoerus hydrochaeris*. *Myrmecophaga tridactyla* (V); *Priodontes giganteus* (V), entre los más espectaculares, así como: *Mazama* spp., *Blastocerus dichotomus* (V), *Ozotocerus bezoarticus* *Tapirus roulini* y *T. terrestris*, *Tayassu tajacu*, *Panthera onca* (V), *Felis concolor*, *Lutra platensis* (V) y *Sotalia fluviatilis*.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Colonos espontáneos en la parte sur cerca al río Yusama y en el norte. Cazadores furtivos rentados por curtiembres. Pistas de aterrizaje dejadas por la actividad petrolera. El Proyecto Hidrosaurios ubicado al Nor Este de la zona con programas de captura de saurios para repoblación de otras lagunas fuera del parque. Un proyecto de carretera interdepartamental lo atravesaría de llevarse a cabo, sin embargo, (junio 1980) no cuenta con apoyo presupuestario.

SCIENTIFIC RESEARCH: Realizado por instituciones extranjeras tal como la Universidad de Wisconsin (16 ornitólogos el año 1979) y nacionales (Universidad de Cochabamba). Existe un convenio entre la Universidad de Cochabamba y el Centro de Desarrollo Forestal (agosto 1979) para realizar actividades conjuntas en el área de los recursos naturales, con fines estrictos de investigación.

SPECIAL SCIENTIFIC FACILITIES: El campamento base del Proyecto Hidrosaurios ubicado en la Laguna Bolivia (N.E. del Parque Nacional).

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Jefe del Parque Nacional.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Sr. Hans Hoffman, Jefe del Parque Nacional Isiboro-Sécure - Villa Tunari - Cochabamba.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(2) Huanchaca National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Totalmente prohibidas toda forma de ocupaci de tierras, de aprovechamiento forestal, caza y pesca comerciales o deportivas. Para proteger la flora y fauna amenazada de exterminio.

DATE ESTABLISHED: 28 junio 1979 (Decreto Supremo 16646).

GEOGRAPHICAL LOCATION: Este de Bolivia. Provincia Velasco, Departamento Santa Cruz; 60°21' a 60°48'W y 13°43' a 14°50'S.

ALTITUDE: Altitud medía 770 m.s.n.m.

AREA: 541,200 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Es una extensa mesa con una ligera pendiente hacia el este; sobre la mesa un relieve ondulado con lineas de drenaje que la disectan. El escarpe de la mesa forma un escalonamiento por erosión diferencial de los metasedimentos. Es un afloramiento de rocas cambrias (Escudo del Brasil) constituido por conglomerados y ortocuarcitos, área de gran valor geológico. Suelos varían de poco profundos a profundos en los valles, arenosos a arenos francos, color pardo oscuro a pardo amarillento claro.

VEGETATION: Bosque perennifolio en los valles que circundan los pisos de drenaje. Hidrofítica en las líneas de drenaje. pastos naturales en los interflujos altos de la mesa. Especies forestales como *Coratella americana*, *Hymenaea* sp., *Tecoma* sp. Las zonas de vida en ella son: bosque muy húmedo subtropical y bosque muy húmedo montano bajo subtropical (Holdridge).

NOTEWORTHY FAUNA: Área reportada como de abundante fauna. Con muy poca información disponible. Presentes: *Tayassu pecari*, *Tapirus terrestris*, *Felis* spp., *Coendou* sp.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: No conocidas, el área tiene un gran valor natural pues no ha sido aun alterada dada su lejanía y dificultad de acceso.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Brockmann, Carlos. s/f. Anexo 1. Los complejos de tierra del oriente Boliviano. Programa ERTS-GEOBOL. La Paz. 98 pp (por publicarse).

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Enrique Jordán, Jefe Departamento de Vida Silvestre, Parques Naciales, Caza y Pesca, Casilla 3430 - Santa Cruz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(3) Bellavista National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: No fué posible establecerla. Aparentemente fué, inicialmente, una reserva forestal.

DATE ESTABLISHED: 27 febrero 1946 (instrumento legal no ubicado).

GEOGRAPHICAL LOCATION: Norte de Bolivia. Provincia Nor Yungas, Departamento La Paz; 67°35'W y 15°45'S.

ALTITUDE: Sobre los 1,400 m.s.n.m. (oficial).

AREA: 90,000 ha (oficial).

LAND TENURE: Estatal.

PHYSICAL FEATURES: Vertientes orientales de los Andes.

VEGETATION: Propias de las siguientes zonas de vida (Holdridge): Bosque muy húmedo montano bajo subtropical. Bosque muy húmedo subtropical. Bosque húmedo subtropical.

NOTEWORTHY FAUNA: No conocidos.

ZONING: Ninguna zonificaci establecida.

DISTURBANCES OR DEFICIENCIES: Area sometida a intensa actividad forestal y a asentamientos espontáneos. Se extraen *Cedrela* y *Juglans* preferentemente. Nunca fué controlada.

SCIENTIFIC RESEARCH: Ninguna.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Cross, Bradley (1979). Wildland management. S.R.B. Associates. 63 pp + anexos. Mimeo.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca, Avenida Camacho 1323 4to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(4) Cerro Sajama National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: No específica. Se entiende protección a los recursos naturales con excepción de las riquezas metalíferas.

DATE ESTABLISHED: 5 noviembre 1945 (Decreto Ley s/No).

GEOGRAPHICAL LOCATION: Oeste de Bolivia. Provincia Carangas, Departamento Oruro; 68°46' a 68°51'W, 18°01' a 18°10'S.

ALTITUDE: 4,500 a 6,542 m.s.n.m.

AREA: 29,940 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: La montaña más alta de Bolivia, se yergue solitaria sobre las planicies altiplánicas. Puede observarse desde más de 100 kilómetros a la redonda. Cubierta de nieves eternas. El cerro Sajama es un volcán del pleistoceno inferior. En sus faldas, en las proximidades del pueblo de Sajama afloran aguatermales sulfurosos con temperaturas de 43°C.

VEGETATION: Los bosques de *Polylepis tarapacana* que se ubicaban sobre los depósitos coluviales-fluviales de sus faldas han sido fuertemente deforestados quedando solo escasísimos ejemplares. Las áreas pantañosas (bofedales) ubicadas a lo largo del río Sajama (oeste inmediato del área) están sobrepastoreadas. Gramíneas y compuestas altoandinas en las partes más bajas.

NOTEWORTHY FAUNA: En las pampas alrededor del cerro Sajama se encuentran *Pterocnemia pennata* en donde no es raro, *Vultur gryphus* probablemente anida en el área. En el río Sajama y lagos cercanos, fuera del área establecida, la avifauna andina es rica: *Anas* spp., *Chloephaga melanoptera*, *Larus serranus*, *Buteo poecilochrous*, *Ptilosceles resplendens* etc. Mamíferos como *Cavia niata*, *Lagidium peruanum*, *Akodon*, *Phyllotis*, *Dusycion culpaeus*. En las proximidades del área muy poca *Vicugna vicugna* (V).

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Bosques de *Polylepis* frecuentemente deforestados para producir carbón, afortunadamente parece que esta presión está disminuyendo debido a una mayor accesibilidad a combustibles derivados de petróleo. Áreas vecinas sobrepastoreadas. Vigilancia temporal.

SCIENTIFIC RESEARCH: Área de interés para el, recientemente creado instituto de Ecología de la Universidad Mayor de San Andrés (La Paz). Algunos estudios botánicos, fitosociología, han sido ya ejecutados.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Guarda Forestal temporal.

BUDGET: Ninguno específico.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Agr. Jorge Pardo, Director Regional - Centro de Desarrollo Forestal, Dirección Regional Oeste. Casilla 382 - Oruro.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio, 1980.

(5) Condoriri National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Total protección de la fauna andina y protección de las bellezas naturales de la Cordillera de los Andes.

DATE ESTABLISHED: 4 de julio 1942 (Decreto Supremo s/No).

GEOGRAPHICAL LOCATION: Oeste de Bolivia. Provincia de Murillo, Departamento de La Paz; 68°04' a 68°11'W, 16°11' a 16°23'S.

ALTITUDE: 4,500 a 6,088 m.s.n.m.

AREA: 14,828 ha.

LAND TENURE: Propiedad del estado.

PHYSICAL FEATURES: Grupo andino delimitado por dos pasos hacia la región de las yungas o vertientes orientales. Caracterizado por los nevados Chacaltaya y Huayna Potosí, incluye lagunas alto andinas. El nevado Chacaltaya presenta laderas cubiertas de nieve aptas para deporte.

VEGETATION: Corresponden a la tundra pluvial alpino subtropical. Se presentan zonas inundadas llamadas 'bofedales' y extensiones de praderas altoandinas dominadas por *Stipas*, *Festuca* y *Calamafrostis*. La Mayor parte del área es cubierta por nieve, cuando ésta se derrite el área es principalmente coluvial.

NOTEWORTHY FAUNA: En el área de lagunas altoandinas: *Larus serranus*, *Anas* spp., *Chloephaga melanoptera*. En los pajonales: *Ptilosceles resplendens*. Todo el área: *Vultur gryphus* (raro). Mamíferos muy pocos: *Lagidium peruanum*.

ZONING: Ninguna zona establecida.

DISTURBANCES OR DEFICIENCIES: Área de deportes: sky, la pista y el albergue administrados por el Club Andino Boliviano. No existente control sobre el ingreso de visitantes. Área de gran presión turística. La Universidad Mayor de San Andrés mantiene un laboratorio (5,150 m.s.n.m.) y áreas con equipo especializado y de ceso prohibido al público pero sin barreras. El área es visitada por recolectores de lajas (coluvio) y de nieve que se utilizan en la ciudad de La Paz, para la construcción y heladerías respectivamente. Acueductos de regulación y líneas eléctricas en el sector sur.

SCIENTIFIC RESEARCH: Investigaciones físicas a cargo del Laboratorio de Física Cósmica de la Universidad Mayor de San Andrés. Equipo de Radiometría.

SPECIAL SCIENTIFIC FACILITIES: Laboratorio de Física Cósmica de la Universidad Mayor de San Andrés (La Paz).

PRINCIPAL REFERENCE MATERIAL: Cross, Bradley (1979). Wildland Management, Reconnaissance Survey J.R.B. Associates (mimeo).

STAFF: Ninguno. El Club Andino Boliviano mantiene 2-3 obreros en el Albergue y en la pista de sky.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca, Avenida Camacho 1323 4to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(6) Las Barrancas National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Terminantemente prohibido destruir la vegetación, el pastoreo y la caza. Área destinada a reforestar parte del valle de Tarija con fines de control de erosión.

DATE ESTABLISHED: 29 agosto 1966 (Decreto Supremo 07807).

GEOGRAPHICAL LOCATION: Sur de Bolivia. Provincia Cercado, Departamento de Tarija; 64°44'W y 21°30'S.

ALTITUDE: 1,916 m.s.n.m. (promedio).

AREA: 347.1 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Parte del valle de Tarija gravemente erosionado. Los suelos son sedimentos del fondo de un lago desecado en el cuaternario (2 millones de años). El régimen pluvial es caracterizado

por una gran intensidad de lluvias en un tiempo corto seguida de una sequía profunda. La lluvia puede llegar a 125 mm en un día y a intensidades de 101.4 mm en una hora.

VEGETATION: La vegetación nativa prácticamente ha desaparecido por deforestación y sobrepastoreo. El área es hoy un campo experimental para la reforestación con especies forestales, arbustivas y hierbas, nativas y exóticas.

NOTEWORTHY FAUNA: No conocidos.

ZONING: Ninguna zonificación se ha establecido.

DISTURBANCES OR DEFICIENCIES: El área es muy pequeña y soporta un tipo de uso propio de un área experimental para recuperación de tierras. Existen trabajos de urbanización resultantes de la expansión de la ciudad de Tarija.

SCIENTIFIC RESEARCH: Muy amplio en el campo de plantaciones forestales.

SPECIAL SCIENTIFIC FACILITIES: Provistas por las instalaciones complementarias del vivero forestal Las Barrancas.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: Propio de un vivero con capacidad para producir 1.5 millones de plantas en 2 turnos. Mínimo 20 obreros.

BUDGET: No determinado.

LOCAL PARK OR RESERVE ADMINISTRATION: Parque Nacional ‘Las Barrancas’, Correo Central, Tarija.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(7) Mallasa National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: No se especifica ninguna medida sobre la flora o fauna. Es un área establecida para esparcimiento de los pobladores de La Paz.

DATE ESTABLISHED: 6 febrero 1956 (Decreto Supremo 4309).

GEOGRAPHICAL LOCATION: Oeste de Bolivia, cercanías de La Paz; Provincia Cercado, Departamento La Paz. 68°13’W y 16°32’12’S.

ALTITUDE: 3,300 m.s.n.m.

AREA: 74 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Una formación muy bella conocida como el ‘valle de la luna’. Los sedimentos periglaciales formados por arcillas muy deleznales han sido extranamente erosionados formando un paisaje extraño y muy atractivo.

VEGETATION: El área es muy pequeña y en ella se han establecido plantaciones de *Eucalyptus* con fines recreativos. Se han introducido diversas especies de cactáceas.

NOTEWORTHY FAUNA: Ninguna especie digna de mención.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Su tamaño es muy pequeño. Constituye un área recreacional. Dominado por especies exóticas,

SCIENTIFIC RESEARCH: Ninguno.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: Ninguna. La municipalidad de La Paz tiene un guardián en el 'cactarium'.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R. Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4to. Piso, La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(8) Cerro Comanche National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Prohibición de quema de pajonales, matorrales, etc. y de todo acto depredatorio de la flora y la fauna. Se establece la no interferencia con los trabajos de la cantera allí existente.

DATE ESTABLISHED: 3 mayo 1963 (Decreto Supremo 06454).

GEOGRAPHICAL LOCATION: Oeste de Bolivia. Provincia Pacajes, Departamento La Paz; 68°25' a 68°25'42'W, 16°57' a 16°58'S.

ALTITUDE: 4,029 a 4,260 m.s.n.m.

AREA: 46.6 ha.

LAND TENURE: Privada. La Ley establece un Consejo de Administración formado por 1 representante de Servicio Forestal y de Caza, 1 representante de la Dirección de Turismo, 1 representante del Cuerpo nacional de Carabineros y por el propietario.

PHYSICAL FEATURES: Montaña aislada no muy alta, ubicada a continuación del Cerro Mirikiri, rodeada de tierras llanas o vallecitos. La montaña es un afloramiento de diorita.

VEGETATION: En las faldas la vegetación es claramente dominada por *Puya raimondii* con una densidad nada común en la región. Otras especies interesantes son las cactáceas: *Trichocereus bertramianus* y *Tephrocactus pertlandii*. Otras: *Eupatorium*, *Senecio graveolens*, *Senecio iodopapus*, *Baccharis microphylla*, *Lepidophyllum quadrangulare*, *Cardium*, *Stipa ichu*, *Ephedra andina* y bromeliáceas: *Tillandsia*.

NOTEWORTHY FAUNA: En las puyas: *Oreotrochilus estella*. En toda el área: *Phalcobaenus megalopterus*, *Ptilosceles resplendens*. Mamíferos: *Lagidium peruanum*.

ZONING: Ninguna zonificación establecida, no está delimitada el área de la cantera, tal como ordena la ley.

DISTURBANCES OR DEFICIENCIES: El Consejo de Administración nunca se implementó, por consiguiente no está delimitada la zona de extracción que ejerce una constante influencia sobre la vegetación. Se produce quema de las puyas y éstas son bastante evidentes. Es un área de turismo cercana a la ciudad de la Paz.

SCIENTIFIC RESEARCH: Ninguno.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(9) Cerro Mirikiri National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: No específica. Se entiende protección a los recursos naturales con excepción de las riquezas metalíferas.

DATE ESTABLISHED: 5 noviembre 1945 (Decreto Let s/No).

GEOGRAPHICAL LOCATION: Oeste de Bolivia. Provincia Pacajes. Departamento La Paz; 68°25' a 68°26'30"W, 16°58' a 16°59'S.

ALTITUDE: 4,059 a 4,205 m.s.n.m.

AREA: No conocidos.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Montaña de laderas suaves unida a montañas más altas y casi rodeada por pequeños valles o quebradas, erosión en surcos.

VEGETATION: En los vallecitos. Probablemente 5.1.23. Tropical Short-grassland. Pradera alto andina con muestras evidentes de sobrepastoreo que dan paso a erosión en surcos. Vegetación muy intervenida sin valor natural especial.

NOTEWORTHY FAUNA: Área con constante presencia humana que origina un alejamiento de la fauna. Aves como: *Ptiloscelus resplendens* y mamíferos como: *Lagidium peruanum* están presentes.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Debido a que nunca se implementó el control, el área ha sufrido acción de sobrepastoreo durante muchos años. Constituye área de pastizales para algunos pobladores cercanos, quienes, probablemente, los consideran suyos por tradición.

SCIENTIFIC RESEARCH: Ninguno.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4to. Piso, La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(10) Tunari National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Área destinada a reforestación con fines de control de erosión. Ninguna referencia a la flora y fauna.

DATE ESTABLISHED: 30 marzo 1962 (Decreto Supremo 06045).

GEOGRAPHICAL LOCATION: Centro oeste boliviano. Provincia Cercado, Departamento Cochabamba; 66°08'W y 17°19'S.

ALTITUDE: 2,800 a 4,400 m.s.n.m.

AREA: No conocidos.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Laderas australes del macizo Tunari, con erosión presente y deslizamientos que afectan a la ciudad de Cochabamba. Incluye algunas lagunas andinas.

VEGETATION: La vegetación original correspondía a la del bosque seco montano bajo subtropical y bosque húmedo montano subtropical (Holdridge). Está vegetación fué fuertemente depredada, quedando algunos radales de *Polylepis*. Hoy en día el área es objeto de un programa de introducción de especies exóticas *Pinus* spp., *Eucalyptus* spp., etc. y de recuperación de nativas: *Polylepis* que se replanta sola o asociada con *Pinus* spp. Se producen pastos y arbustos nativos también.

NOTEWORTHY FAUNA: La fauna está incrementando en función de la cobertura recuperada: *Metropelia* entre las aves y *Silvilagus* entre los mamíferos siendo considerado este último como plaga forestal por los daños a la reforestación.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Su tamaño es pequeño y constituye un área netamente de reforestación. Hoy en día es denominado Proyecto Integral Tunari, del Centro de Desarrollo Forestal.

SCIENTIFIC RESEARCH: El Proyecto Integral Tuari está acumulando información sobre comportamiento de especies forestales, micorrizas en el suelo y asociación entre especies nativas y exóticas, principalmente.

SPECIAL SCIENTIFIC FACILITIES: Las de la Escuela Técnica Forestal.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: One Ing. Agr., Jefe del Proyecto Integral Tunari; 3 Guardas forestales; 42 Obreros forestales.

BUDGET: No fué posible determinarlo.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Candido Pastor, Jefe Proyecto Integral Tunari - Casilla 3111 - Cochabamba.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(1) Manuripi Heath Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.6.1 (Madeiran).

LEGAL PROTECTION: Terminantemente prohibida la caza comercial u deportiva hasta que se

realicen los estudios necesarios. Solo se permite la caza científica autorizada. las propiedades particulares se someteran a las limitaciones y disposiciones del Ministerio de Agricultura. No se permiten asentamientos.

DATE ESTABLISHED: 20 diciembre 1973 (Decreto Supremo 11252).

GEOGRAPHICAL LOCATION: Noroeste boliviano. Departamento de Pando; 66°00' a 69°00'W y 10°55' a 12°30'S.

ALTITUDE: 200 m.s.n.m. altitud media.

AREA: 1,844,375 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Llanura aluvial, ríos de curso meandrico, se presentan meandros abandonados, cicatrices de meandros, cauces paralelos. Diferencia de nivel no mayor a 15 mts. Terrazas. Suelos de poco profundos a profundos, color dominante pardo oscuro. Río Orthon con ancho de 80 a 100 mts., profundidad máxima 10 mts. y río Manueipi con ancho de 35 mts. y aguas oscuras. Río Madre de Dios con ancho de 400 mts. inunda las terrazas recientes. Clima húmedo.

VEGETATION: *Lowland rain forest* vegetación natural de bosque latifoliado perennifolio, 90 per cent de cubierta arbórea, altura 30 mts. Estratos inferiores muy densos y enmarados. Se aclara un poco hacia el río Madre de Dios. Los arbustos llegan a tener 6 mts. de altura. Especies importantes *Bombax*, *Scheelea princeps*, *Ficus* ep., *Guarea rusby*, *Ocotea* sp., *Hura crepitans*, *Sapium* sp., *Triplaris caracasama*, *Euterpe andicola*, *Copernicia* sp. Hacia el río Madre de Dios las especies son: *Cecropia peltata*, *Ochroma lagopus*, *Bulnesia sarmienti*, *Inga* sp., *Tabebuia* sp., *Orbignya phalerata*, *Astrocaryum chonta*, *Cedrela* sp. Zona de vida bosque húmedo subtropical (Holdridge).

NOTEWORTHY FAUNA: Primates de valor científico como: *Cebuella pygmaea*, *Saguinus labiatus*, *Saguinus imperator* y *Callimico goeldi*. *Odocoileus dichotomus*, sometido a fuerte presión onca estan entre los mamíferos más saltantes.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Las margenes de los ríos Beni, Madre de Dios y parte del Manuripi son áreas de colonización espontanea. Partes del área constituyen proyectos del Instituto Nacional de Colonización. Caza no controlada. No existe ningun control. Aparentemente existe un grupo nativo: Toronona al que es necesario definir y dimensionar.

SCIENTIFIC RESEARCH: No conocido.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Grimwood, I. y Whitmore, T. (1978). Bolivia. Informe IUCN.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(2) Eduardo Avaroa Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Terminantemente prohibida la caza comercial y deportiva hasta que el Ministerio de Agricultura realice los estudios.

DATE ESTABLISHED: 13 diciembre 1973 (Decreto Supremo 11239).

GEOGRAPHICAL LOCATION: Sur de Bolivia. Provincia Sud Lipez. Departamento de Potosí: 67°46'W y 22°12'S.

ALTITUDE: 4,278 a 5,780 m.s.n.m.

AREA: 400,000 ha (1981).

LAND TENURE: Estatal.

PHYSICAL FEATURES: lago de los Solares alto andino ubicado entre la Cordillera Occidental y la Cordillera de Lipez. El lago se ubica en una zona de puna seca y una variedad de zonas edáficas. Predomina el paisaje de planicie desértica con suelos pedregosos. Laguna de agua salada. Alimentado por deshielos de los nevados Tocorpuri y Tocatcare principalmente. Su coloración se debe a la existencia de piroclásticos de color rojo. Poca alimentación y mucha evaporación. Activa vida de fitoplancton e insectos. Clima frío y seco. Temperatura media 10°, mínima media de -3°, precipitación 100 mm anuales.

VEGETATION: Las comunidades vegetales presentan variedades de *Lopidophyllum*, *Bacharis*, *Tetraglochin*, *Stipa*, *Festuca*, *Senecio*, *Ephedra*, Cactaceas bajas: *Tephrocactus*. Bellas formaciones de *Azorella compacta*. Vegetación propia del desierto subalpino templado y de la tundra seca alpina templada (Holdridge).

NOTEWORTHY FAUNA: Aves: *Phoenicopterus ruber chilensis*, *Phoenicopterus andinus*, *Phoenicopterus jamesi*, *Chloephaga melanoptera*, *Recurvirostra andina*, *Pterocnemia pennata*, *Speotyto cunicularia*, *Metropelia melanoptera*. Mamíferos como: *Vicugna vicugna* (V)(muy pocas), *Felis concolor*, *Felis colocolo*, *Dusycion culpaeus*, *Lagidium peruanum*. Varios roedores.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Extracción de yareta (Azorella), recolección de huevos de flamencos, caza y pesca. No existe control.

SCIENTIFIC RESEARCH: Area mundialmente conocida. Ninguna investigación como Reserva Nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Jungius H. y Pujol, R. (1970). Bolivia. National Parks and Reserves. UNESCO. Paris.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(3) Reserva Nacional de Fauna Ulla Ulla

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Protección de la flora y fauna nativa en vías de extinción, ejecución de la ley de prohibición de la caza de vicuna. Sometimiento de todas las actividades agropecuarias al Ministerio de Asuntos Campesinos y Agropecuarios.

DATE ESTABLISHED: 7 enero 1972 (Decreto Supremo 10070).

GEOGRAPHICAL LOCATION: Noroeste de Bolivia. Provincia Franz Tamayo, Departamento La Paz; 69°00' a 69°20'W y 14°45' a 15°25'S.

ALTITUDE: Altitud media 4,300 m.s.n.m.

AREA: 137,800 ha.

LAND TENURE: Estatal, presencia de pobladores tradicionales cuyos usos sobre la tierra son respetados.

PHYSICAL FEATURES: La pampa de Ulla Ulla es una de las más altas y grandes áreas de puna. Delimitada, al este por una cadena de montañas (promedio 5,900 m.s.n.m.). Lenguas glaciales dan lugar a lagunas alto andinas (Lagunas, Suches, Colocolo, Quella, Canahuma etc.). La Pampa que se origina en las montañas se caracteriza por suaves pendientes para continuar en una amplia y plana pampa cortada por varias corrientes formando pequeñas planicies inundadas. La pampa hacia el oeste presenta grandes extensiones igualmente inundadas, con algunas colinas aisladas.

VEGETATION: La pampa dominada por pastos, de los cuales quedan muy pequeñas áreas sin sobrepastoreo, prob. 5.1.2.3. *Tropical short-grassland*. En las zonas inundadas: *Distichia muscoides*, *Senecio* sp., *Calamagrostis vicunarum*, *Werneria* sp., etc. En general vegetación propia de zonas de vida (Holdridge), bosque húmedo subalpino Subtropical y tundra pluvial alpino Subtropical.

NOTEWORTHY FAUNA: 1,139 *Vicugna vicugna* (V) en 1979, y taruca *Hippocamelus antisensis* (V). Muchos roedores: *Phyllotis* sp., *Lagidium* sp., *Akodon* sp.; *Felis concolor*, *Dusycion* sp., *Conepatus rex*. Aves numerosas: *Chloephaga melanoptera*, *Plegadis ridwayi*, *Anas* spp., *Gallinula chloropus*, *Fulica americana*, *Ptilosceles resplendens* etc.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: El área es administrada por INFOL con supervisión, establecida en convenio, del Centro de Desarrollo Forestal, dentro del Proyecto de Desarrollo Rural Integrado Ulla Ulla. La infraestructura y equipos asignados a esta Reserva Nacional son utilizados por INFOL en otras áreas. Sobrepastoreo del área. Escaso personal de guardaparques.

SCIENTIFIC RESEARCH: Censos de la población de vicuñas. Análisis de la dinámica de poblaciones. Investigaciones de Etología.

SPECIAL SCIENTIFIC FACILITIES: 2 casas alojamiento para técnicos.

PRINCIPAL REFERENCE MATERIAL: Jungius, Hartmut (1971). The vicuna in Bolivia. *Sanderdruck Aus. Z.f. Säugetierkunde*. Bd. 36 H. 3, 129-146. Verlag. Paul Parey. Hamburgo.

STAFF: 1 Jefe de la Reserva Nacional; 6 Guardas de fauna.

BUDGET: No fue posible determinarlo.

LOCAL PARK OR RESERVE ADMINISTRATION: Sr. Juan Nogales. Reserva Nacional de Fauna Ulla Ulla.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(4) German Busch Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Terminantemente prohibida la caza comercial y deportiva en el área hasta que se dispongas estudios básicos. No se permiten asentamientos humanos nuevos. Las propiedades dentro del área quedan sujetas a las limitaciones y disposiciones del Ministerio de Agricultura.

DATE ESTABLISHED: 20 diciembre 1973 (Decreto Supremo 11254).

GEOGRAPHICAL LOCATION: Centro este boliviano. Provincia Ichilo, Departamento de Santa Cruz; 63°39' a 64°04'W y 17°34' a 17°55'S.

ALTITUDE: 400 a 1,929 m.s.n.m.

AREA: 98,640 ha.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Región conocida como las serranías del ámboro. Terreno muy irregular, pendientes fuertes, numerosas quebradas, el río yapacaní nace en esa región. Últimas estribaciones de las vertientes orientales andinas. Información climática no disponible.

VEGETATION: Límite sur de la región de las yungas. Vegetación de las zonas de vida bosque muy húmedo montano bajo Subtropical y bosque muy húmedo Subtropical. Tipo 1.11.2. *Montane/submontane rain forest*.

NOTEWORTHY FAUNA: Mamíferos como *Mazama* spp., *Tayassu pecari*, *Panthera onca*, *Felis* sp. Gran variedad de aves propias de yungas.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Penetración de actividades forestales y colonización espontánea por el sur (hierba buena). No existe control establecido.

SCIENTIFIC RESEARCH: No conocido.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Enrique Jordán P. Jefe del Departamento de Vida Silvestre, parques Nacionales, Caza y Pesca, Casilla 3430 - Santa Cruz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(5) Lagunas del Beni y Pando

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.6.1 (Madeiran).

LEGAL PROTECTION: Se establece una veda (diciembre a julio) para la caza de caimán y lagarto. Se prohíbe la caza de ejemplares menores de 1.50 mt. (caimán) y 1.20 mt. (lagarto).

DATE ESTABLISHED: 27 octubre 1961 (Decreto Supremo 05912).

GEOGRAPHICAL LOCATION: Norte de Bolivia. Departamentos Beni y Pando. Todas las lagunas ubicadas en ellos; 61°30' a 69°40'W y 9°15' a 15°33'S.

ALTITUDE: Alrededor de 200 m.s.n.m. (promedio).

AREA: Difícil de precisar, incluye por lo menos 27 grandes lagunas ubicadas, en su mayoría, en el departamento de Beni.

LAND TENURE: Estatal.

PHYSICAL FEATURES: Son las lagunas de los llaños o savanas del Beni, algunas de ellas muy extensas como las lagunas Rogagua, Rogaguado, Huatunas y San Luis, orillas con playa o boscosas inundadas o orillas movedizas cubiertas de plantas acuáticas densamente entrelazadas.

VEGETATION: S.G. Aquatics.

NOTEWORTHY FAUNA: *Plecostomus*, *Ptergopichthys multiradiatus*, *Loricaria beni*, Serrasalmidos etc. *Caiman*, *Palliosuchus*.

ZONING: Ninguna zonificación establecida.

DISTURBANCES OR DEFICIENCIES: Los componentes de esta reserva nacional se hallan ampliamente dispersos, principalmente, en el departamento del Beni, lo cual dificultara el control, cuando este se implemente.

SCIENTIFIC RESEARCH: Area visitada por expediciones científicas, muy específicas, desde 1921. Ninguna investigación considerandola como área protegida.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocido.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Oscar Méndez R., Jefe Nacional de Vida Silvestre, Parques Nacionales, Caza y Pesca. Avenida Camacho 1323 4 to. Piso - La Paz.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(1) Huancaroma Forest Refuge

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: No se establecen medidas concretas. Se supone protección total a la vicuña.

DATE ESTABLISHED: 23 Julio 1975.

GEOGRAPHICAL LOCATION: Centro este Boliviano. Provincia Cercado, Departamento de Oruro; 67°23' a 67°30'W y 17°39' a 17°47'S.

ALTITUDE: 3,800 m.s.n.m. altitud medía.

AREA: 11,000 ha.

LAND TENURE: Privada. La ley no establece mecanismos para la administración pero garantiza que ni el status legal jurídico ni la propiedad de la hacienda Huancaroma son afectadas.

PHYSICAL FEATURES: Area principalmente plana, influenciada por el río Desaguadero, que a veces inunda los terrenos adyacentes. Suelos salinos.

VEGETATION: Las partes no cultivadas, conforman una pradera alto andina con manojos de ichu y presencia de *Bromus* sp. y *Distichlys* sp. El área cultivada lo es con alfalfa.

NOTEWORTHY FAUNA: Fundamentalmente *Vicugna vicugna* (V) 181 ejemplares en 1979 (INFOL, información oficial). En las cercanías de la casa hacienda no muestran temor.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: El área es de ganadería lechera para producción de quesos, 350 reses en total. Area irrigada de cultivo de pastos para ensilado. El personal de la hacienda, teóricamente, funge de guardas de fauna. No existe control especial.

SCIENTIFIC RESEARCH: Censos periodicos (INFOL).

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Grimwood, I. y Whitmore, T. (1978). Bolivia, Informe IUCN.

STAFF: Ninguno.

BUDGET: Ninguno.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Agr. Jorge Pardo, Director Regional, Centro de Desarrollo Forestal. Casilla 382 - Oruro.

NAME OF CNPPA COORDINATOR: M. Ríos.

INFORMATION DATED: Julio 1980.

(1) Reserva Biologica de Ulla Ulla

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Declared a national natural reserve for fauna by Supreme Decree. Hunting and the destruction of flora and fauna are totally prohibited.

DATE ESTABLISHED: January 1977.

GEOGRAPHICAL LOCATION: Approximately 100 air-miles northwest of La Paz, the western boundary being the Peruvian border; 15°00'S, 69°00'W.

ALTITUDE: 3000-5800m.

AREA: 200,000 ha.

LAND TENURE: Although as a reserve for fauna the territory is state property, certain areas in the plains belong to rural communities under the terms of the declaration concerning Agrarian Reform in Bolivia. However, this does not affect the science and technology policy for the territory.

PHYSICAL FEATURES: Located in the higher parts of Bolivia, the reserve contains a combination of ecological formations including high plateau, tundra, high cordillera, mountains, the headwaters of the Rio Euichi and Rio Turiopa, nine lakes, and a nival zone. The Apolobamba stands out as the chief mountain range along with the Cololo massif. Formations of the Yungas type, with its typical plant associations, are evolving east of the cordillera massif.

VEGETATION: The area is rich in habitat diversity. There are Yungas areas in the north-east in which Gramineae such as *Stipa* spp. predominate, tundra areas in the high cordillera and high-mountain forest stands in parts of the western sector.

NOTEWORTHY FAUNA: On the high plateaux and the tundra, the fauna consists mainly of Camelidae. The vicuña *Vicugna vicugna* (V) is particularly important, with a population estimated at 600, and the alpaca population is 800,000. In the cordillera and the heads of valleys *Odocoileus* sp. and spectacled bear *Tremarctos ornatus* (V) can be found. North Andean Huemul *Hippocamelus antisensis* (V) are also found in the reserve. Birds abound in the lakes where the predominant fish are trout (Salmonidae), which were introduced in the 1940s and are used for restocking other river basins in the interior of Bolivia.

ZONING: The habitat of the vicunas is regarded as the core area, the other ecological formations being concentric to it.

DISTURBANCES OR DEFICIENCIES: No agricultural activity is possible in any part of the zone owing to the persistent frosts and low temperatures. Consequently, the sole activity is the raising of alpacas, and to a lesser degree llamas. As the reserve is state property, the vicunas live in complete freedom. The human population is estimated at 800 inhabitants of Aymaran origin, who live in small settlements in the high plateaux, which are linked by precarious routes. The area could be an important tourist centre, but the present roads are virtually unusable.

SCIENTIFIC RESEARCH: A group of visiting scientists has conducted a recent study of the pasture land. The World Wildlife Fund has contributed to the protection of the vicunas by providing cabins and a vehicle for the small number of forest rangers. Because of the variety of habitat and ecological formations, the reserve is of exceptional importance for scientific research. Access to more distant parts of the reserve is difficult because of the poor roads.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: The most useful scientific literature is contained in the works of Koford, Franklin and Jungius. Annual inventories are produced of the vicuna and other fauna populations.

STAFF: The area comes under the Department of Wildlife, National Parks, Hunting and Fishing of the Bolivian Ministry of Agriculture. It is supervised by four rangers who have received instruction in the 'Pampas Galeras', Peru.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Att. Prof. Gaston Berjarano, Departamento de Vida Silvestre, Parques Nacionales, Caza y pesca, Casilla Correo 936, La Paz, Bolivia.

NAME OF CNPPA COORDINATOR: M. Rios.

INFORMATION DATED: (Information received from Unesco).

(2) Parque Nacional Pilon-Lajas

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.6.1 (Madeiran).

LEGAL PROTECTION: To be declared a national park under the general law on wildlife 12,301 of 14 March 1975 (sic). We have no recent information on this area, which was not listed in information sent to us in July 1980.

DATE ESTABLISHED: January 1977 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: On the far eastern spur of the cordillera of the Andes; 15°00'S, 67°20'W. The nearest human settlement is San Borja, 70km from the western boundary of the park.

ALTITUDE: 280-2000m.

AREA: 100,000 ha.

LAND TENURE: State property.

PHYSICAL FEATURES: Highlands with mountain forests intersected by valleys. There are subtropical and tropical forests associated with Amazonian deposits, comprising a variety of plant associations and ecological environments characteristic of the different altitudes and degrees of humidity, etc. Landscapes of exceptional scenic beauty.

VEGETATION: The flora of the reserve corresponds to the sub-hylean tropical vegetation with forest canopies containing emergents in some zones. Pioneer vegetation is to be found in some areas in

association with climax types; characteristic mountain and valley forests are also present. The dominant families and genera are characteristic of the Amazon.

NOTEWORTHY FAUNA: The typically Amazonian fauna abounds in arthropods, birds and reptiles, but includes only limited numbers of mammals and fish. The black spider monkey *Ateles paniscus* (V) has been seen in the park.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The area is at present virtually undisturbed by man. The only human settlement consists of a small indigenous population of Chimanes living in their traditional fashion. A road linking La Paz, Alto Beni, San Borja and Trinidad has been started, and constitutes one of the boundaries of the park.

SCIENTIFIC RESEARCH: No scientific research has as yet been conducted in the area. As a national park it will serve essentially as a reserve for wildlife. However, owing to its climax conditions, all manner of biological, ecological and physical research could be envisaged. While facilities are lacking at present, the road under construction along one boundary and other public works will make the area easily accessible from La Paz or Beni.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Holz, G.S. and Bejarano, G. (In press). Final Report on the Project: Parque Nacional Pilon-Lajas. WWF Morges, Switzerland.

STAFF: At present the scientific and administrative staff of the Department of Wildlife and National Parks of the Ministry of Agriculture of Bolivia collaborates with the scientific and executive personnel of the MAB Programme in Bolivia.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Professor Gaston Bejarano, Departamento Vida Silvestre, Parques Nacionales, Caza y Pesca, Ministerio de Agricultura, Casilla Correo 936, La Paz, Bolivia.

NAME OF CNPPA COORDINATOR: M. Rios.

INFORMATION DATED: (Information received from Unesco).

BRAZIL

AREA: 8,511,968 sq km.

POPULATION: 121,113,084 (1980).

PARKS AND RESERVES LEGISLATION: The rules and criteria for the establishment of National Parks, Biological Reserves and National Forests are set down in the "Codigo Florestal Federal", Law 4771 of 15 September 1965. The Law of Fauna Protection (Law 5197, 3 January 1967) also provides for the establishment of Game Reserves (none have been established to date), as well as other categories of biological reserves, and hunting reserves. The objectives and main administrative by-laws were established by "Regulamento dos Parques Nacionais Brasileiros", Federal Decree 84.017 of 21 September 1979. The IBDF, which administers the National Parks and Biological Reserves, was created by Decree-Law 289 (28 February 1967). Ecological Stations are established under Federal Decree 84,973 (29 July 1980), Law 6,902 (27 April 1981), and Federal Decree 86,061 (2 June 1981).

PARKS AND RESERVES ADMINISTRATION: The responsibility for management of National Park lands lies with the Instituto Brasileiro de Desenvolvimento Florestal (IBDF), Ministério da Agricultura, and for the Ecological Stations with the Secretaria Especial do Meio Ambiente (SEMA) - Ministério do Interior.

National Parks are areas with exceptional natural attributes which have been set aside for the purpose of providing an integral protection for flora, fauna and scenic beauty. These areas are intended to be used for education, recreation and scientific research. Biological Reserves are areas where modification of any type is prohibited, except duly authorized scientific activity (this includes both hunting and introduction of wild or domesticated species). Protected Forests are resource reserves, some of which are intended to be used, and some of which may be reclassified in the future. Hunting Parks, which are also established under the Fauna Protection Law, are areas where hunting is permitted. (Wetterberg *et al.*, 1978).

The Ecological Stations are natural areas preserved for the purpose of offering basic infrastructure to universities for the promotion of comparative study between the situation encountered in these and neighbouring sites occupied by man (SEMA, 1977).

ADDRESS: (a) Depto. de Parques Nacionais, Instituto Brasileiro de Desenvolvimento Florestal (IBDF), S.A.I.N. Av. 1/4 S/No., Brasília, DF, 70.300, Brazil. Telephone (061) 1711 or 2120.

(b) Secretaria Especial do Meio Ambiente (SEMA), Ministério do Interior, 2º Andar, Esplanada dos Ministérios, Projecao 23, Brasília, DF, Brazil.

REFERENCES: Carvalho, J.C.D.M. (1981). The Conservation of Nature and Natural Resources in the Brazilian Amazonia. CVRD - revista Vol. 2, Special Edition.

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IUCN/WWF Project 1614. Brazil, Primates.

IUCN/WWF Project 1705. Ecology and Conservation of the Amazonian Manatee.

IUCN/WWF Project 1717. Eastern Brazil, Research into Studies of Endangered Bird Species.

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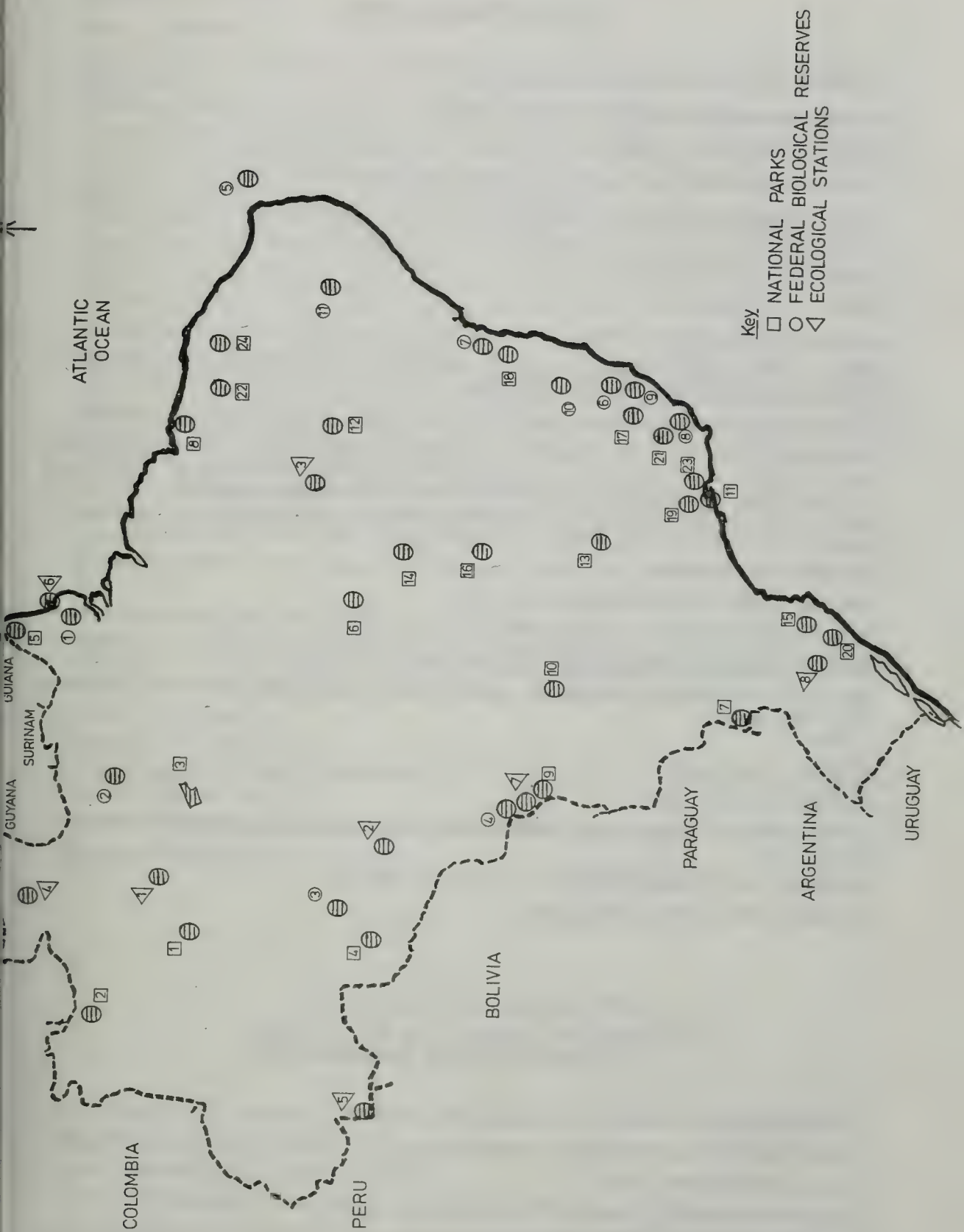
Wetterberg, G.B., Soares de Castro, C., Tresinari, B., Quintao, A., and Rocha Porto, E. (1978). Estado atual dos parques nacionais e reservas equivalentes na america do sul-1978 *Brasil Florestal* No. 36 (Out-Dez) Min. Agric. IBDF. Brasília. pp. 11-36.

TOTAL AREA UNDER PROTECTION: 10,618,721 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Jau	2,272,000
2 Pico da Neblina	2,200,000
3 Amazonia	1,000,000
4 Pacaas Novos	764,802
5 Cabo Orange	619,000
6 Araguaia	562,312
7 Iguaçu	170,086
8 Lençois Maranhenses	155,000
9 Pantanal Matogrosso	137,000
10 Emas	131,868
11 Serra da Bocaina	100,000
12 Serra da Capivara	100,000
13 Serra da Canastra	71,525
14 Chapada dos Veadeiros	60,000
15 Sao Joaquim	44,455
16 Brasília	28,000
17 Caparao	16,194
18 Monte Pascoal	14,000
19 Itatiaia	11,943
20 Aparados da Serra	11,307
21 Serra dos Orgaos	9,370
22 Sete Cidades	6,221
23 Tijuca	3,300
24 Ubajara*	563
Federal Biological Reserves	
1 Lago Piratuba	395,000
2 Rio Trombetas	385,000
3 Jaru	268,150
4 Cara-cara	61,126
5 Atol das Rocas	36,249
6 Sooretama	24,000
7 Una	11,400
8 Poco das Antas	5,063
9 Nova Lombardia	4,350
10 Corrego do Veado	2,400
11 Serra Negra	1,100
Ecological Stations	
1 Anavilhanas	350,000
2 Iquê	200,000
3 Uruçui-Una	135,000
4 Maraca	92,000
5 Rio Acre	77,500
6 Maraca-Jipioca	70,000
7 Taiama	12,000
8 Aracuri-Esmeralda*	272
State Parks	
1 Jacupiranga*	150,000
2 Rio Doce*	35,712
3 Ilha do Cardoso*	22,500
4 Caraguatatuba*	13,770
5 Campos do Jordao*	8,172
6 Jaiba*	6,211
7 Vila Velha*	3,122
8 Ibitipoca*	1,488

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.



(1) Jau National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 September 1980 by Federal Decree 85,200.

GEOGRAPHICAL LOCATION: Amazonas State, 150km west-northwest of Manaus; 01°40'-03°00'S, 61°25'-63°50'W.

ALTITUDE: Less than 100m.

AREA: 2,272,000 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: A large river flat with some areas of tableland and deeper valleys cut by several of the western tributaries of the Rio Negro.

VEGETATION: Palm trees, open tropical forest, dense tropical forest, campinarana grassland.

NOTEWORTHY FAUNA: Black-head uakari *Cacajao melanocephalus* (V), the tamarin *Saguinus inustus*, common squirrel monkey *Saimiri sciureus*, widow monkey *Callicebus torquatus*, white-fronted and black-capped capuchins *Cebus albifrons* and *C. apella*, douroucoulis *Aotus trivirgatus*, saki *Pithecia pithecia*, red howler *Alouatta seniculus*, jaguar *Panthera onca* (V), giant otter *Pteronura brasiliensis* (V), Amazonian manatee *Trichechus inunguis* (V) macaws *Ara* spp. and various Amazonian fish.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: find info.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Rylands, A.B. (1980-81). Conservation of Amazonian Primates. Unpd. Rpt. Maps.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: BR-319, Km1, Distrito Industrial, CEP 69,000, Manaus AM.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(2) Pico da Neblina National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 5 June 1979 by Federal Decree 83,550.

GEOGRAPHICAL LOCATION: Northeast Amazonas State between the Rio Negro and the Venezuelan border; 01°00'-0°20'S, 65°15'-66°50'W.

ALTITUDE: 100-3,014m.

AREA: 2,200,000 ha.

LAND TENURE: A large part of the area is title-free. Indians are present, but there are no proclaimed Indian Reserves.

PHYSICAL FEATURES: The Amazonas-Orinoco interfluvial plateau contains rock faults of the Guyanan complex and sedimentary rocks of the Roraima group. The Roraima sedimentary plateau is the most elevated area of the park, containing the 3,014m Pico da Neblina and has blocks of the inselberg type with tabular faults. The Rio Branco - Rio Negro pediplain was caused by erosion that exposed the base of the block constituting the Guyana Craton (Precambrian rocks).

VEGETATION: Caatinga of the upper Rio Negro, a dense arboreal formation characterized by *Caraíoa taquari*, *Clusia* cf. *columaris*, *Mauritia flexuosa*. Open arboreal formation characterized by *Humiria balsamifera*, *Eperua purpurea*, *Hevea rigidifolia*. Dense tropical forest with *Micropholis guianensis*, *Licania membranacea*, *Swartzia viridifolia*, *Pouteria engleri*, *Qualea albiflora*, *Astrocaryum mumbaca*. Open tropical forest with *Orbygnia* cf. *racemosa*, *Puteria guianensis*, *Carvocar glabrum*.

NOTEWORTHY FAUNA: Black-headed uakari *Cacajao melanocephalus* (V), the red-headed tamarin *Saguinus midas*, common squirrel monkey *Saimiri sciureus*, widow monkey *Callicebus torquatus*, black-capped capuchin *Cebus apella*, white-fronted capuchin *C. albifrons*, douroucoulis *Aotus trivirgatus*, black saki *Chiropotes satanas*, long-haired spider monkey *Ateles belzebuth* (V), red howler *Alouatta seniculus*, bush dog *Speothos venaticus* (V), jaguar *Panthera onca* (V), giant anteater *Myrmecophaga tridactyla* (V), black hawk-eagle *Spyzaetus tyrannus*, Guianan cock-of-the-rock *Rupicola rupicola*, black curassow *Crax alector*, marial guan *Penelope marial*.

ZONING: The park is contiguous with the Venezuelan Serrania La Neblina National Park.

DISTURBANCES OR DEFICIENCIES: Very limited access because of remoteness; park without implementation.

SCIENTIFIC RESEARCH: Indication of Pleistocene refuges by Haffer (1969/74); Prance (1973); Brown (1976).

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Radar images (1:250,000); survey of natural resources and mapping at a scale of 1:100,000 executed by Project Radambrasil. Rylands, A.B. (1980-81). Conservation of Amazonian Primates. Unpd. Rpt.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: BR, 319 - Km 1, Distrito Industrial Cx. Postal 185 - 69,000 - Manaus - AM.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(3) Amazonia National Park (also known as Tapajos National Park)

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Incomplete (77%).

DATE ESTABLISHED: 19 February 1974, by Federal Decree.

GEOGRAPHICAL LOCATION: Southern Para and southeastern Amazonas states; 3°42' - 4°50'S, 47°21' - 56°22'W.

ALTITUDE: 19-200m.

AREA: 1,000,000 ha, though Carvalho (1981) records this park as extending to 1,258,000 ha.

LAND TENURE: Part IBDF and part privately owned.

PHYSICAL FEATURES: A large plain dissected by the River Tapajos which contains small hills with vertical slopes.

VEGETATION: Rainforest, submontane forests and open tropical forest.

NOTEWORTHY FAUNA: Includes the spectacled caiman *Caiman crocodilus*, black caiman *Melanosuchus niger* (E), yellow spotted sideneck turtle *Podocnemis unifilis* (V), South American river turtle *P. expansa* (E), river dolphins *Ina geoffroyensis* and *Sotalia fluviatilis*, osprey *Pandion haliaetus*, harpy eagle *Harpia harpyia* (R), giant otter *Pteronura brasiliensis* (V), Amazonian manatee *Trichechus inunguis* (V), giant anteater *Myrmecophaga tridactyla* (V), bush dog *Speothos venaticus* (V) and jaguar *Panthera onca* (V). Primates include the tassel-eared marmoset *Callithrix h. humeralifer* (E), white marmoset *C. argentata leucippe* (V), common squirrel monkey *Saimiri sciureus*, dusky titi *Callicebus moloch*, white-fronted and black-capped capuchins *Cebus albifrons* and *C. apella*, two species of saki *Pithecia hirsutus* and *Chiropotes albinasus* (V), the nocturnal douroucoulis *Aotus trivirgatus*, long-haired spider monkey *Ateles belzebuth marginatus* (V), red-handed howler *Aloutta belzebul*, and possibly the black spider monkey *Ateles paniscus chamek* (V) and woolly monkey *Lagothrix lagothrica* (V). There are differences between the two sides of the river which make both important faunistically. While *C. albifrons* and *P. hirsutus* are only found on the western side, for example, *C. albinasus* is only found to the east.

ZONING: Intangible, Primitive, Extensive, Intensive, Special, Recuperation and Historical-Cultural zones.

DISTURBANCES OR DEFICIENCIES: Lack of personnel, unresolved land ownership problems and insufficient funding.

SCIENTIFIC RESEARCH: Worm studies and a taxonomic study of Amazon dragonflies.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Management plan, radar maps (1:250,000); satellite maps (1:100,000). Preliminary survey of amphibians and a summary of amphibian research in Amazonia NP; bird survey; IUCN/WWF Project 1345 Amazon National Park - Master Plan.

STAFF: 1 director, 8 park guards, 2 general workers, 4 administrative personnel.

BUDGET: Cr\$ 6,000,000.00 (1981).

LOCAL PARK OR RESERVE ADMINISTRATION: Raimundo Nonato Russo Filho, Director of Amazonia National Park - Rodovia Transamazonica, Estrada de Itaituba para Jacareacange Km 53 Itaituba, Para, 68,180 Brazil.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(4) Pacaas Novos National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 21 September 1979 by Federal Decree 84,019.

GEOGRAPHICAL LOCATION: Rondonia Federal Territory on the western extension of the Brazilian plateau; 10°11'-11°50'S, 62°30'-64°10'W.

ALTITUDE: 200-1,126 m.

AREA: 764,802 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Steep-sided, flat-topped mountains comprising three major chains - the Pacaas Novos, the Uopianes and the Moreira Cabral Mountains.

VEGETATION: Cerrado, open tropical forest and tropical forest.

NOTEWORTHY FAUNA: Jaguar *Panthera onca* (V), puma *Felis concolor*, black-tailed marmoset *Callithrix argentata*, common squirrel monkey *Saimiri sciureus*, dusky titi *Callicebus moloch*, American tapir *Tapirus terrestris*, a species of brocket deer *Mazama* sp. and a pit viper *Lachesis* sp.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Access to the park area is difficult.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Maps; System Plan for Brazil's Conservation Units.

STAFF: No information.

BUDGET: Cr\$ 70,000,000.

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Pinheiro Machado, Porto Velho, Rondonia - CEP: 78,900.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(5) Cabo Orange National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 15 July 1980 by Federal Decree 84,913.

GEOGRAPHICAL LOCATION: Amapa Federal Territory; 04°26'-03°30'N, 51°09'-51°35'W.

ALTITUDE: 0-200m.

AREA: 619,000 ha, 120,000 of which is marine.

LAND TENURE: Owned by the Territory.

PHYSICAL FEATURES: Marine flats and riverside flats.

VEGETATION: Mangroves, grassland, cerrado/forest ecotone and dense tropical forest.

NOTEWORTHY FAUNA: Green turtle *Chelonia mydas* (E), leatherback turtle *Dermochelys coriacea* (E), scarlet ibis *Eudocimus ruber*, greater flamingo *Phoenicopterus ruber*, Amazona spp., Amazonian manatee *Trichechus inunguis*, (V), Caribbean manatee *T. manatus* (V), jaguar *Panthera onca* (V), common squirrel monkey *Saimiri sciureus*, puma *Felis concolor*, capybara *Hydrochoerus hydrochaeris*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Access to the park is difficult.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: No information.

BUDGET: Cr\$ 1,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Secretaria de Agricultura do Amapa, Av. Mendonça Furtado 53, Macapa Amapa.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(6) Araguaia National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 31 December 1959 by Federal Decrees 45,570 and altered by Decree 68,873 (5 July 1971) and 71,897 (1 March 1973).

GEOGRAPHICAL LOCATION: Ilha do Bananal, 750km northwest of Brasilia, west central region, Goias state; 9°00'-10°50'S, 49°56'-50°37'W.

ALTITUDE: 200-240m.

AREA: 562,312 ha (2,000,000 ha were proposed in the original act (the entire Ilha di Bananal) but the effective size was still only 3000 ha in 1972).

LAND TENURE: It is hoped that ownership of land will be transferred to Goias state soon.

PHYSICAL FEATURES: The park includes part of the 2,000,000 ha island of Bananal, the largest fluvial island in the world, a flat area of Quaternary period fluvial sediments on Mesozoic sandstones between the main and minor branches of the Araguaia River. It is subject to seasonal flooding, and contains several permanent lakes.

VEGETATION: A transition zone between the woody savanna or 'Cerrados' and Amazon forests with gallery forests along the river banks. Scattered marshland, and often seasonally flooded grassland.

NOTEWORTHY FAUNA: The fauna, like the vegetation, is transitional, and includes giant anteater *Myrmecophaga tridactyla* (V), maned wolf *Chrysocyon brachyurus* (V), bush dog *Speothos venaticus* (V), giant otter *Pteronura brasiliensis* (V), jaguar *Panthera onca* (V), puma *Felis concolor*, marsh deer *Blastocerus dichotomus* (V), pampas deer *Ozotocerus bezoarticus*, American tapir *Tapirus terrestris*, harpy eagle *Harpia harpyia* (R), hyacinthine macaw *Anodorhynchus hyacinthinus*, anaconda *Eunectes murinus*, South American river turtle *Podocnemis expansa* (E) and arapaima *Arapaima gigas*. IUCN (1977) also record giant armadillo *Priodontes giganteus* (V) and black-fronted piping guan *Aburria jacutinga* (E).

ZONING: Intangible, Primitive, Extensive Use, Intensive Use, Recuperation, and Special Use Zones.

DISTURBANCES OR DEFICIENCIES: Protection is not enforced, with free-ranging domestic animals present, land tenure problems and poaching.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: Housing is available for scientific research workers.

PRINCIPAL REFERENCE MATERIAL: Cartography 1:50,000; aerial photos; Parque Nacional do Araguaia - Informe Turistico by Humberto de Miranda Bastos; Management Plan.

STAFF: 1 director, 1 technician, 12 park guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Levi Vargas, Director of the Park, Rua 229, No. 95 Setor Universitario, 74.000 Goiânia-Goias.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(7) Iguaçu National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Incomplete (98%).

DATE ESTABLISHED: 10 January 1939 by Federal Decree 1,035, amended by Decree 6,587 (14 June 1944).

GEOGRAPHICAL LOCATION: South region, Parana State, close to the Argentinian and Paraguayan borders; 25°05'-25°41'S, 53°40'-54°38'W.

ALTITUDE: 150-740 m.

AREA: 170,086 ha, but only 134,000 ha were effective in 1972.

LAND TENURE: Mostly owned by IBDF.

PHYSICAL FEATURES: At the confluence of the Iguaçu and Parana Rivers, this area is generally flat with red semi-lateritic soils which are nutrient poor. The Iguaçu Falls in the lower part of the park drop 80 m over 2700 m and are formed by the Iguaçu river, which is cutting a giant staircase down a Triassic basalt flow. Humid subtropical climate, with over 2000 mm rainfall per annum, and a relative humidity of 80-90%. Annual mean temperature 20°C.

VEGETATION: The lower park is subtropical rainforest rich in tree ferns (Cyatheaceae) and epiphytes with species of *Ilex*, *Podocarpus*, *Aspidosperma*, *Cedrela* and *Philodendron*. The upper part is humid subtropical deciduous forest with stands of the Brazilian pine *Araucaria angustifolia* (here at its western limit), with two palms, the Assai palm *Euterpe edulis* and wild coconut palm *Cocos romanzoffiana*, and the imbuja *Phoebe porosa*.

NOTEWORTHY FAUNA: Giant otter *Pteronura brasiliensis* (V), La Plata otter *Lutra platensis* (V), ocelot *Felis pardalis* (V), jaguar *Panthera onca* (V), puma *Felis concolor*, margay *Felis wiedii* (V), brocket deer *Mazama rufina*, American tapir *Tapirus terrestris*, collared peccary *Tayassu tajacu*, white-lipped peccary *T. peccari*, great dusky swift *Cypseloides senex*, solitary tinamou *Tinamus solitarius*, ornate hawk-eagle *Spizaetus ornatus*, red-breasted toucan *Ramphastos dicolorus* and harpy eagle *Harpia harpyia* (R). Jorge Padua *et al* (1974) also record bush dog *Speothos venaticus* (V), giant anteater *Myrmecophaga tridactyla* (V), pampas deer *Ozotocerus bezoarticus*, black-fronted piping guan *Aburria jacutinga* (E), glaucous macaw *Anodorhynchus glaucus* (E), and the vinaceous-breasted and red-spectacled parrots *Amazona vinacea* and *A. petrei* (V). IUCN (1977) also record black howler monkey *Alouatta caraya*, capybara *Hydrochoerus hydrochaeris*, puma *Felis concolor*, black hawk-eagle *Spizaetus tyrannus*, chimango caracara *Milvago chimango*, crested caracara *Polyborus plancus brasiliensis*, white-tailed trogon *Trogon viridis*, rufous ovenbird *Furnarius rufus*, broad-nosed cayman *Caiman latirostris* (E), dwarf cayman *Paleosuchus palpebrosus* and the urutu viper *Bothrops alternata*.

ZONING: Primitive, Extensive, Intensive, Recuperation, Special, Cultural-Historic, Intangible zones.

DISTURBANCES OR DEFICIENCIES: There are two federal highways and a large private hotel within the park. Enforcement of boundaries is a major problem.

SCIENTIFIC RESEARCH: A tree survey.

SPECIAL SCIENTIFIC FACILITIES: Housing is available for scientists, and there is a museum which includes laboratory facilities.

PRINCIPAL REFERENCE MATERIAL: Aerial photographs; maps of park; park lists of flora and fauna; management plan.

STAFF: 1 director, 10 administrative staff, 15 park guards, 17 general workers.

BUDGET: Cr\$ 10,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Adilson Simao, Administrator of Iguazu National Park - 85,890 - Foz do Iguazu - Parana - PR.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(8) Lençois Maranhenses National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.29.10 (Babacu).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981 by Federal Decree 86,060.

GEOGRAPHICAL LOCATION: Maranhao State; 02°20'-02°45'S, 42°45'-43°30'W.

ALTITUDE: 0-50m.

AREA: 155,000 ha, of which 12,000 ha is marine.

LAND TENURE: Owned by the Navy and the Union.

PHYSICAL FEATURES: Dunes region.

VEGETATION: Mangroves and 'restingas'.

NOTEWORTHY FAUNA: Some shore and marine birds.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: System plan of Brazil's Conservation Units.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Jaime Tavares, 25 - C. Postal 276, Sao Luiz, Maranhao - 65,000.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 4 June 1981.

(10) Emas National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Incomplete (98%).

DATE ESTABLISHED: 11 January 1961 by Federal Decree 49,874 and altered by Decree 70,375 (6 April 1972).

GEOGRAPHICAL LOCATION: Centre west region, state of Goias near the Mato Grosso border; 17°50'-18°15'S, 52°30'-53°10'W.

ALTITUDE: 650-1,000m.

AREA: 131,868 ha, but effectively only 79,000 ha prior to 1972.

LAND TENURE: Mainly owned by IBDF, but two private areas remain to be acquired.

PHYSICAL FEATURES: Large areas of slightly undulating grasslands on Triassic sedimentary sandstones in which there are basalt and diorite intrusions. The area forms a watershed and there are many springs and watercourses, draining mainly to the east.

VEGETATION: Cerrado, wet grasslands, murunduns grasslands, brejo, vereda, mesophytic forest of interfluves, gallery forest. The cerrado scrub, which covers the vast majority of the park, is the best example of this type of vegetation in Brazil.

NOTEWORTHY FAUNA: The fauna is typical of central Brazilian 'savanna' and high densities of pampas deer *Ozotocerus bezoarticus*, giant anteater *Myrmecophaga tridactyla* (V) and greater rhea *Rhea americana*, can be seen within the park. Others include giant armadillo *Priodontes giganteus* (V), maned wolf *Chrysocyon brachyurus* (V), La Plata otter *Lutra platensis* (V), marsh deer *Blastocerus dichotomus* (V), collared peccary *Tayassu tajacu*, puma *Felis concolor*, ocelot *Felis pardalis* (V), jaguar *Panthera onca* (V), capybara *Hydrochoerus hydrochaeris*, bare-faced curassow *Crax fasciolata*, crested eagle *Morphnus guianensis* (R), blue and yellow macaw *Ara ararauna*, white-tailed hawk *Buteo albicaudatus*, king vulture *Sarcorampus papa*, spotted nothura *Nothura maculosa*, red-winged tinamou *Rhynchotus rufescens*, undulated tinamou *Crypturellus undulatus*. Jorge Padua *et al* (1974) also record giant otter *Pteronura brasiliensis* (V), and bush dog *Speothos venaticus* (V) has also been recorded. There are also many termite mounds, and glow-worms or fireflies are known to swarm in great numbers at certain times.

ZONING: Recuperation, Intangible, Primitive, Extensive, Intensive, and Special zones.

DISTURBANCES OR DEFICIENCIES: Uncontrolled fires, insufficient funds and water pollution. Most of the fires are set deliberately by ranchers outside the reserve, but get out of control.

SCIENTIFIC RESEARCH: Study of armadillos and anteaters; bird survey.

SPECIAL SCIENTIFIC FACILITIES: Housing is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Management plan prepared by Dr Goetz Schuerholz (IUCN/WWF Project 1346), cartography, aerial photographs.

STAFF: 1 director, 5 park guards, 1 general worker.

BUDGET: Cr\$ 2,500,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Heber Silva de Oliveira, Director of Emas National Park - Rua 229, No. 95 - Setor Universitario - 74,000 - Goiânia - GO.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(11) Serra da Bocaina National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serra do mar).

LEGAL PROTECTION: Partial (14%).

DATE ESTABLISHED: 4 February 1971, by Federal Decree 68,172 with alterations by Decree 70,694 (8 June 1972).

GEOGRAPHICAL LOCATION: Southeast region, states of Rio de Janeiro and Sao Paulo on the Atlantic coast; 22°40'-23°22'S, 44°25'-44°57'W.

ALTITUDE: 0-2,150m.

AREA: 100,000 ha, though this was not effective in 1972. 140,000 ha were planned in the original act.

LAND TENURE: Part privately owned and part IBDF owned.

PHYSICAL FEATURES: Includes an offshore island, a small bay and sandy and rock beaches along the coast, the deeply cut valleys leading up to the Serra da Bocaina plateau, with plains above 1800m which are noted for the granitic batholiths and rounded gneiss blocks exposed on the surface.

VEGETATION: Tropical rainforest up to about 1800 m, then upland forests and gallery forests dominated by *Araucaria angustifolia* and *Podocarpus* spp. merge into the plateau grasslands.

NOTEWORTHY FAUNA: The fauna is typical of the Atlantic coastal forest and includes woolly spider monkey *Brachyteles arachnoides* (E), buffy-tufted-ear marmoset *Callithrix aurita* (E), brown howler monkey *Alouatta fusca* (I), American tapir *Tapirus terrestris*, capybara *Hydrochoerus hydrochaeris*, jaguar *Panthera onca* (V), vinaceous-breasted parrot *Amazona vinacea*, solitary tinamou *Tinamus solitarius*, red-capped parrot *Pionopsitta pileata*, bare-throated bellbird *Procnias audicollis*, harpy eagle *Harpia harpyia* (R), black hawk-eagle *Spizaetus tyrannus*, ornate hawk-eagle *S. ornatus*, black-fronted piping guan *Aburria jacutinga* (E), blue-bellied parrot *Triclaria malachitacea*, tegu *Tupinambis teguixin*. Jorge Padua *et al* (1974) also record giant and La Plata otters *Pteronura brasiliensis* (V) and *Lutra platensis* (V) and giant anteater *Myrmecophaga tridactyla* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Land tenure problems, and high degree of modification.

SCIENTIFIC RESEARCH: No information, though IUCN (1977) noted that the plateau area had been studied.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Property ownership survey, plant survey.

STAFF: 1 director, 1 administrator, 3 park guards and 10 general workers.

BUDGET: Cr\$ 2,300,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Mario Augusto Bernardes Rondon, Director of Serra da Bocaina National Park - Av. Presidente Antonio Carlos, 607-12° andar - 17,540 - Rio de Janeiro - RJ.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(12) Serra da Capivara National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.20.4 (Caatinga).

LEGAL PROTECTION: Incomplete (95%).

DATE ESTABLISHED: 5 June 1979 by Federal Decree 83,548.

GEOGRAPHICAL LOCATION: Southeast Piaui State, 220km south of Floriano; 08°30'-08°50'S, 42°20'-42°40'W.

ALTITUDE: 250-650m.

AREA: 100,000 ha.

LAND TENURE: The land is being transferred from state to national ownership.

PHYSICAL FEATURES: Physiographically the area is connected with the Piaui and Bom Jesus do Gurgeia regions of the north-east basin. Geomorphologically it consists of a plain created under the semi-arid climate of the late Tertiary or Pleistocene, with tabled areas that have been subject to erosion. Extensive plateaux with borders delimited by arenitic cliffs are most common on the south-east side of the park.

VEGETATION: Dense brush caatinga with a predominance of *Astronium urundueva*, *Schinopsis brasiliensis*, *Anadenanthera macrocarpa*, *Mimosa* sp., *Caesalpinia* sp., *Neoglaziovia variegata*, *Cereus gounellii*.

NOTEWORTHY FAUNA: Ocelot *Felis pardalis* (V), bush dog *Speothos venaticus* (V), rock cavy *Kerodon rupestris*, red-legged seriema *Cariama cristata*, and a species of *Tropidurus* lizard.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: There is a villa within the park.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Radar images (1:250,000); mapping (1:100,000), executed by DSG; analysis of the early (BC) rock paintings.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Avenida Coronel Costa Araujo, 1567 - Bairro Joquei Club Cx. Postal 80 - 64,000 Teresina - PI.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(13) Serra da Canastra National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 3 April 1972 by Federal Decree 70,355.

GEOGRAPHICAL LOCATION: North-east region, Minas Gerais state, 270km west of Belo Horizonte; 20°10'-20°20'S, 46°15'-47°00'W.

ALTITUDE: 800-1,300m.

AREA: 71,525 ha, though this was not effective in 1972 and has been reduced by over half since the publication of the World Directory (IUCN, 1977). 200,000 ha were planned in the original act.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: A plateau with steep walls or escarpments, at the source of the Sao Francisco River.

VEGETATION: Highland grassland, rocky grasslands, cerrado, grasslands with short shrubby growth.

NOTEWORTHY FAUNA: Maned wolf *Chrysocyon brachyurus* (V), giant anteater *Myrmecophaga tridactyla* (V), rhea *Rhea americana*, red-legged seriema *Cariama cristata*, buff-necked ibis *Theristicus caudatus*, *Nothura* spp., giant armadillo *Priodontes giganteus* (V). IUCN (1977) records a number of other species, but with the reduction in size many of these may no longer be found within the park.

ZONING: Recuperation, Special, Primitive, Extensive and Intensive zones.

DISTURBANCES OR DEFICIENCIES: Fires (seriously damaged by fire in 1982); illegal cattle grazing.

SCIENTIFIC RESEARCH: Ecological studies of the maned wolf including radio telemetry; study of giant anteaters; survey of park mammals.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Dietz, J.M. (1980). Ecological studies of the Maned Wolf in the Serra da Canastra National Park, Minas Gerais State, Brazil, South America. IUCN/WWF Project 1584. July 1978-June 1980. Final report to IUCN/WWF.

Other reports for IUCN/WWF Project 1548.

Shaw, J.H. and Carter, T.S. (1980). Giant Anteaters. *Natural History* 89(10): 62-67.

Park management plan; aerial photographs; resource survey.

STAFF: 1 director, 5 administrative staff, 7 park guards, 5 general workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Oliveiro de Almeida Soares, Director of Serra da Canastra National Park - Rua 1° de Janeiro, no. 110 - Sao Roque de Minas, Minas Gerais.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(14) Chapada dos Veadeiros National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Partial (33%), but not effective at all until after 1972.

DATE ESTABLISHED: 11 January 1961 by Federal Decree 49,857 (as Tocantins NP) but was not yet in effect in 1972 when it was altered by Decree 70,492 (11 May 1972).

GEOGRAPHICAL LOCATION: West central region, Goiás state, about 200km north of Brasília; 13°50'-14°12'S, 47°24'-47°58'W.

ALTITUDE: 400-1,784m.

AREA: 60,000 ha (reduced since the World Directory was published in 1977). 625,000 ha were proposed in the original act.

LAND TENURE: A land tenure survey is currently being conducted.

PHYSICAL FEATURES: The topography of the Veadeiros high plain is flat with shallow soils, and areas of exposed rock. Quartzite and sandstone predominate, with pegmatite fissures in the rock. The highest mountain in Goiás state, Pico do Pouso Alto, lies within the park.

VEGETATION: Grasslands (campos) and scrub forests (cerrado), with dense gallery forest in the more humid valleys.

NOTEWORTHY FAUNA: Pampas deer *Ozotocerus bezoarticus*, greater rhea *Rhea americana*, hyacinthine macaw *Anodorhynchus hyacinthinus*, muscovy duck *Cairina moschata*, white-tailed hawk *Buteo albicaudatus*, king vulture *Sarcoramphus papa*, American tapir *Tapirus terrestris*, capybara *Hydrochoerus hydrochaeris*, collared peccary *Tayassu tajacu*, puma *Felis concolor*, ocelot *Felis pardalis* (V), jaguar *Panthera onca* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Lack of park buildings; land tenure problems, but the reserve is isolated with difficult access.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Botanic survey maps.

STAFF: 1 director, 6 park guards, 2 general workers.

BUDGET: Cr\$ 23,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Fernando Jesus Oliveira, Director of Chapada dos Veadeiros National Park, Rua 229 Lotes 7 e 8 - 74,000 Goiânia - Goiás.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(15) Sao Joaquim National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serra do mar).

LEGAL PROTECTION: None.

DATE ESTABLISHED: 6 July 1961 by Federal Decree 50,992.

GEOGRAPHICAL LOCATION: South region, Santa Catarina state, 175km southwest of Florianopolis; 28°04'-28°19'S, 49°22'-49°39'W.

ALTITUDE: 800-2,000m.

AREA: 44,455 ha, though this was not in effect in 1972. 49,300 ha were proposed in the original act.

LAND TENURE: Part privately owned and part Santa Catarina state owned.

PHYSICAL FEATURES: Part of the southern Brazilian plateau, undulating with deeply cut valleys, and mainly formed from decomposed basalt overlain by sandstone and some glacial clays. There is usually snowfall during a few days of each winter, creating exceptional conditions in an otherwise tropical regime.

VEGETATION: High altitude grassland dominates the plateaux. Pine gallery forests with candelabra, or Parana pine *Araucaria angustifolia* in the upper valleys, and subtropical forest in the lower areas.

NOTEWORTHY FAUNA: La Plata otter *Lutra platensis* (V), ocelot *Felis pardalis* (V), azure jay *Cyanocorax caeruleus*, swallow-tailed kite *Elanoides forficatus*, vinaceous-breasted parrot *Amazona vinacea*. IUCN (1977) also records giant anteater *Myrmecophaga tridactyla* (V), pampas deer *Ozotocerus bezoarticus* and the ornate hawk-eagle *Spizaetus ornatus*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: There are land tenure problems, and IUCN (1977) reported many lumber mills in the area despite protection against lumbering which should be in force.

SCIENTIFIC RESEARCH: A land survey is in progress.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: 1 technician and 8 park guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: José Dilve Baldin - Director - Av. Mauro Ramod no. 187 - Ed. Nacional - Cx. Postal 660 - CEP. 89,000 - Florianopolis - SC.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(16) Brasilia National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 November 1961, by Federal Decree 241.

GEOGRAPHICAL LOCATION: Northeastern region to the northeast of the Federal District; 15°35'-15°45'S, 47°55'-48°05'W.

ALTITUDE: 700-1,300m.

AREA: 28,000 ha (30,000 ha were proposed in the original act).

LAND TENURE: Owned by IBDF, the boundaries being fixed and fenced.

PHYSICAL FEATURES: Undulating high plateau of quartzite and limestone with springs and caves. There is a mean annual temperature of 20.6°C and an annual rainfall of 1675mm. Numerous of the springs and a reservoir in the park supply the capital with drinking water. Winds are predominantly from the east.

VEGETATION: Upland tree savanna or cerrado and campo cerrado with gallery forests around the springs and watercourses. The Buriti palm *Mauritia vinifera* is found within these forests along with members of the Velloziaceae.

NOTEWORTHY FAUNA: Maned wolf *Chrysocyon brachyurus* (V), pampas deer *Ozotocerus bezoarticus*, giant anteater *Myrmecophaga tridactyla* (V), greater rhea *Rhea americana*, red-legged seriema *Cariama cristata*, osprey *Pandion haliaetus*, king vulture *Sarcoramphus papa* and crowned eagle *Harpyaliaetus coronatus*. Jorge Padua *et al* (1974) also record bush dog *Speothos venaticus* (V), giant otter *Pteronura brasiliensis* (V), giant armadillo *Priodontes giganteus* (V) and two seed finches, *Oryzoborus crassirostris* and *O. angloensis*. IUCN (1977) record most of these, along with black howler monkey *Alouatta caraya*, forest rabbit *Sylvilagus brasiliensis*, *Juscelinomys candangus*, cavy *Galea spixii*, spotted tinamou *Nothura maculosa*, lesser yellow-headed vulture *Cathartes burrovianus urubutinga*, burrowing owl *Speotyto cunicularia*, toco toucan *Ramphastos toco*, curl-crested jay *Cyanocorax cristatellus*, and the fer-de-lance *Bothrops jararaca*, musurana *Pseudoboa cloelia* and tegu *Tupinambis teguixin*.

ZONING: Intangible, Primitive, Extensive, Intensive, Special and Recuperation zones.

DISTURBANCES OR DEFICIENCIES: The park is very close to the capital city.

SCIENTIFIC RESEARCH: Bird-banding studies, rodent studies, studies on anteaters and armadillos.

SPECIAL SCIENTIFIC FACILITIES: Lodging for scientists.

PRINCIPAL REFERENCE MATERIAL: Brasilia NP bird check-list, fish survey, termite survey, marmoset behaviour study, management plan, aerial photographs, survey made by CODEPLAN.

STAFF: 1 director, 1 technician, 8 administrative staff, 36 park guards, 23 general workers.

BUDGET: Cr\$ 4,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Luiz Van Beethoven Benicios de Abreu, Director of Brasilia National Park - Setor de Areas Isoladas Norte - Via EPIA - Brasilia - D.F. - CEP - 70,000.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(17) Caparao National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 May 1961 by Federal Decree 50,646.

GEOGRAPHICAL LOCATION: Southeast region, states of Espirito Santo and Minas Gerais; 20°22'-20°40'S, 41°40'-42°20'W.

ALTITUDE: 997-2,890m.

AREA: 16,194 ha, though the effective size was only 5,000 ha in 1972.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Mountainous terrain of the Serra do Caparao on the northernmost edge of the Serra do Mar, largely composed of Precambrian gneissic granites and with continuous elevations above 2500m, culminating with Pico da Baneira at 2890m. Oceanic influence produces higher precipitation on the eastern slopes.

VEGETATION: Tropical rain forest up to about 1800m, then high open grassland with alpine communities above 2400m. There is rain forest on both sides of the divide, but that on the Minas Gerais side has no oceanic influence. The alpine communities consist largely of members of three families, the Ericaceae, Melastomaceae and Myrtaceae.

NOTEWORTHY FAUNA: Margay *Felis wiedii* (V), black-pencilled marmoset *Callithrix penicillata*, nine-banded armadillo *Dasypus novemcinctus*, woolly spider monkey *Brachyteles arachnoides* (E), forest rabbit *Sylvilagus brasiliensis*, paca *Agouti paca*, crab-eating racoon *Procyon cancrivorus*, small-billed tinamou *Crypturellus parvirostris*, turkey vulture *Cathartes aura*, rusty-margined guan *Penelope superciliaris*, rufous-tailed antbird *Drymophila genei*, Itatiaia spinetail *Oreophylax moreirae*. The buffy-headed marmoset *Callithrix flaviceps* (E) possibly also occurs here (WWF/IUCN Project 1614). Jorge Padua *et al* (1974) also record giant armadillo *Priodontes giganteus* (V), maned wolf *Chrysocyon brachyurus* (V), giant anteater *Myrmecophaga tridactyla* (V) and pampas deer *Ozotocerus bezoarticus*, while IUCN (1977) also record brocket deer *Mazama americana*, saffron toucanet *Andigena balloni* and the red-ruffed crow *Pyroderus scutatus*.

ZONING: Primitive, Extensive Use, Intensive Use, Historical-Cultural, Recuperation and Special Use zones.

DISTURBANCES OR DEFICIENCIES: Lack of funding, insufficient personnel and park buildings.

SCIENTIFIC RESEARCH: Snake studies.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Management plan, aerial photographs, maps.

STAFF: 1 director, 2 administrative staff, 13 park guards, 3 general workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Pithagoras Ottoni Cardoso, Director of Caparao National Park, Avenida Catarina Eller, 708 - Caixa Postal 17 - 36,976 - Presidente Soares - Minas Gerais.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(18) Monte Pascoal National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 November 1961 by Federal Decree 242.

GEOGRAPHICAL LOCATION: North-east region, Bahia State, 150km north of the border with Espirito Santo; 16°45'-16°55'S, 39°08'-39°30'W.

ALTITUDE: 0-586m.

AREA: 14,000 ha (decrease in size since publication of World Directory 1977, as over 7,000 ha was given to Pataxos Indians in August 1980). The original size was 22,500 ha.

LAND TENURE: IBDF owned.

PHYSICAL FEATURES: The area presents a variety of physical features, including dunes, mangroves, lagoons, barrier beaches and small hills of Pre-cambrian rock, rising to the 586m of Monte Pascoal.

VEGETATION: Southern Bahian hydrophilic forest, grasslands, mangrove swamps, sand bank, cipo forests (forest with many lianas and bamboo thickets, but poor in epiphytes). Forest trees include the Brazilian rosewood *Dalbergia nigra*.

NOTEWORTHY FAUNA: Masked titi *Callicebus personatus melannochir* (V), black-capped capuchin *Cebus apella robustus*, opossum *Didelphis* sp., *Felis* spp., maned sloth *Bradypus torquatus* (E), American tapir *Tapirus terrestris*, collared peccary *Tayassu tajacu*, jaguar *Panthera onca* (V), bare-throated bellbird *Procnias nudicollis*, blue-cheeked parrot *Amazona rhodocorytha*, king vulture *Sarcorampus papa*, harpy eagle *Harpia harpyia* (R), solitary tinamou *Tinamus solitarius*, dusky-legged guan *Penelope obscura*, red-billed curassow *Crax blumenbachi*, ornate hawk-eagle *Spizaetus ornatus* and black hawk-eagle *S. tyrannus*. Other sources list a number of other species, but because of the reduction in size of the park it is not known whether they now occur within the boundaries.

ZONING: Intangible, Primitive, Extensive, Intensive, Recuperation and Historical-Cultural zones.

DISTURBANCES OR DEFICIENCIES: Insufficient staff and funds; lack of park buildings.

SCIENTIFIC RESEARCH: Floristic studies by the Botany Department, Centro de Pesquisas do Cacau, Itabura, BA.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Management plan; aerial photographs; cartography; studies on the vertebrate fauna.

STAFF: 1 administrator, 10 park guards and 1 general worker.

BUDGET: Cr\$ 2,000,000 for 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Ed. Suerdick - Avenida Estados Unidos 14 - 4º andar - Salas 4-5/4-7 - 40,000 - Salvador - Bahia.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(19) Itatiaia National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serro do mar).

LEGAL PROTECTION: Incomplete (90%).

DATE ESTABLISHED: 14 June 1937 by Federal Decree 1,713.

GEOGRAPHICAL LOCATION: South-east region, 150 km north-west of Rio de Janeiro in the State of Rio de Janeiro; 22°29'-22°45'S, 44°45'W.

ALTITUDE: 816-2,787m.

AREA: 11,943 ha, but only 10,000 ha were effective in 1972. 12,000 ha were proposed in the original act.

LAND TENURE: Mostly owned by IBDF, with a few hectares still under private ownership.

PHYSICAL FEATURES: Mountainous topography with vast rock faces, deep valleys and gigantic boulders. The area includes part of the plateau of the Serra da Mantiqueira at 2200m and rises to 2787m at the Pico do Itatiaiuçu (the summit of Agulhas Negras). The Serra da Mantiqueira is a major eruptive massif predominantly composed of alkaline nephelitic rocks of igneous origin dating from the upper Cretaceous. The park includes a few lakes and marshes at lower levels.

VEGETATION: Tropical rainforest rich in lianas, lichens, ferns, orchids and begonias up to about 1600m and pine forests (*Araucaria angustifolia*) in the valleys up to about 2000m. Highland grasslands and forests, and shrub savannah, with montane flora including many endemics, the monotypic *Itaia cleistopetala* being particularly of note.

NOTEWORTHY FAUNA: Harpy eagle *Harpia harpyia* (R), black-fronted piping guan *Aburria jacutinga* (E), red-capped parrot *Pionopsitta pileata*, the dusky-legged guan *Penelope obscura*, brown tinamou *Crypturellus obsoletus*, black and gold cotinga *Tijuca atra*, the black-capped capuchin *Cebus apella nigrinus*, masked titi *Callicebus personatus nigrifrons* (V), possibly the woolly spider monkey *Brachyteles arachnoides* (E), crab-eating racoon *Procyon cancrivorus*, *Boa constrictor*, and tegu *Tupinambis teguixin*. Jorge Padu *et al* (1974) also record the maned wolf *Chrysocyon brachyurus* (V), La Plata otter *Lutra platensis* (V), giant anteater *Myrmecophaga tridactyla* (V), maned sloth *Bradypus torquatus* (E), solitary tinamou *Tinamus solitarius* and black hawk-eagle *Spizaetus tyrannus*. The buffy-tufted-ear marmoset *Callithrix aurita* (E) now appears to have disappeared from the park, as has the brown howler monkey *Alouatta fusca* (I). IUCN (1977) also record lesser anteater *Tamandua tetradactyla*, coati *Nasua nasua*, ocelot *Felis pardalis* (V), ornate hawk-eagle *Spizaetus ornatus*, turkey vulture *Cathartes aur ruficollis*, king vulture *Sarcorampus papa*, toco toucan *Ramphastos toco*, short-tailed ant thrush *Chamaeza campanisona brevicauda*, magpie tanager *Cissopis leveriana*, jararaca viper *Bothrops jararaca*, coral snake *Micurus corallinus*, iguanid lizard *Tropidurus torquatus*, snake-necked tortoise *Hydromedusa maximiliani* and the blacksmith tree-frog *Hyla faber*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Small private farms and a hotel within the park. Much of it was damaged by fire in 1982.

SCIENTIFIC RESEARCH: Social wasps and evolution. Systematics and ecology of neotropical plant genera. Frog studies.

SPECIAL SCIENTIFIC FACILITIES: A natural history museum and lodging for scientists.

PRINCIPAL REFERENCE MATERIAL: Management plan in preparation. Cartography (1:10,000); aerial photographs.

STAFF: 1 director, 1 biologist, 24 rangers, 6 general workers.

BUDGET: Cr\$ 2,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: José Ribamar de Souza - Director - R. Pacheco Leao 2040, Rio de Janeiro - R.J. - CEP. 20,020.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(20) Aparados da Serra National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.9.2 (Brazilian Planalto).

LEGAL PROTECTION: Partial (56%).

DATE ESTABLISHED: 17 December 1959 by Federal Decree 474,466, with modifications by Decree 70,296 (17 March 1972) although the park is only now being implemented.

GEOGRAPHICAL LOCATION: Southern region, southeast Santa Catarina State and northeast Rio Grande do Sul, 120km northeast of Porto Alegre; 29°15'-29°25'S, 50°00'-50°15'W.

ALTITUDE: 200-900m.

AREA: 11,307 ha. 13,000 ha were proposed in the original act, but the effective size was still only 3,550 ha in 1972.

LAND TENURE: Mainly IBDF but part privately owned.

PHYSICAL FEATURES: The South Brazilian plateau and coastal ranges terminate abruptly in this area in cliffs up to 500m high, exposing basalt flows. The plateau is undulating with small swampy areas, and springs and streams originating from the tops of the undulating high plain which cut deeply into the cliffs of the plateaux, creating high waterfalls (including the 400m falls of the Canyon of Itaimbezinho).

VEGETATION: Southern plains grasslands and Atlantic pine forests with the Brazilian pine *Podocarpus latifolia*. The park protects the only two species of Brazilian conifer, the Parana pine *Araucaria angustifolia* and the *Podocarpus* (*Araucaria* being at the southeastern limit of its range). Vegetational succession is forming peat bogs in many of the small pools and lakes on the plateau.

NOTEWORTHY FAUNA: Includes the azure jay *Cyanocorax caeruleus*, yellow-legged tinamou *Crypturellus noctivagus*, crested eagle *Morphnus guianensis* (R), yellow-billed pintail *Anas georgica*, long-tailed cinclodes *Cinclodes pabsti*, dusky-legged guan *Penelope obscura*, vinaceous-breasted parrot *Amazona vinacea*, and red-capped parrot *Pionopsitta pileata* among the birds. Mammals include giant anteater *Myrmecophaga tridactyla* (V), black-capped capuchin *Cebus apella*, and brown howler monkey *Alouatta fusca* (I). IUCN (1977) also record the opossum *Didelphis marsupialis aurita*, giant armadillo *Priodontes giganteus* (V), seven-banded armadillo *Dasypus septemcinctus*, La Plata otter *Lutra platensis* (V), giant otter *Pteronura brasiliensis* (V), pampas cat *Felis concolor pajeros*, pampas deer *Ozotoceros bezoarticus*, chimango caracara *Milvago chimango*, rufous oven-bird *Furnaria rufus*, urutu viper *Bothrops alternata* and snake-eating snake *Rachidelus brazili*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Private farmlands, insufficient funding and lack of administrative buildings.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Maps, mammal survey and plant survey.

STAFF: 1 director, 3 park guards.

BUDGET: Cr\$ 70,000,000 to solve the lands problem.

LOCAL PARK OR RESERVE ADMINISTRATION: Antonio Rabelo Lara - Director - Itaimbezinho - Cambara do Sul - RS. CEP 95.480.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(21) Serra dos Orgaos National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serra do mar).

LEGAL PROTECTION: Partial (25%).

DATE ESTABLISHED: 30 November 1939 by law Decree 1,822.

GEOGRAPHICAL LOCATION: Southeast region Rio de Janeiro state, 55km northwest of the centre of Rio de Janeiro; 22°24' -22°32'S, 42°59' -43°06'W.

ALTITUDE: 410-2,263m.

AREA: 9,370 ha, but only 5,000 ha were effective in 1972.

LAND TENURE: Part IBDF and part privately owned.

PHYSICAL FEATURES: Steep relief on the edge of a giant fault block composed mainly of granite and gneiss, forming a chain of geological monuments that give the appearance of organ pipes, including the famous Dedo de Deus (Finger of God) peak.

VEGETATION: Luxuriant and varied due to the wide range of altitude. Lower levels have tropical rain forest rich in lianas, ferns and epiphytes (including orchids and bromeliads). The upper slopes have montane grasslands, a notable species being the endemic *Prepusa hookeriana* (Gentianaceae) which occurs on the peak of Pedro do Sino. Brush and small trees occur in sheltered areas in the montane zone, the trees being covered with lichens and mosses.

TOURISM: Facilities include footpaths, nature trails, mountain huts and a restaurant. Good mountaineering. Large numbers of visitors.

NOTEWORTHY FAUNA: Black howler monkey *Alouatta caraya*, black-capped capuchin *Cebus apella nigrilus*, collared peccary *Tayassu tajacu*, ocelot *Felis pardalis* (V), maned sloth *Bradypus torquatus* (E), green winged saltator *Saltator similis* and a species of pit viper *Bothrops* sp. The La Plata otter *Lutra platensis* (V) has also been recorded, and the woolly spider monkey *Brachyteles arachnoides* (E) possibly still occurs here, but the buffy-tufted-ear marmoset *Callithrix aurita* (E) now appears to have disappeared from the park. (IUCN/WWF Project 1614). Jorge Padua *et al* (1974) also record La Plata otter *Lutra platensis* (V), solitary tinamou *Tinamus solitarius*, ornate and black hawk-eagles *Spizaetus ornatus*, *S. tyrannus*, and the black-fronted piping guan *Aburria jacutinga*. IUCN (1977) also record philander opossum *Caluromys philander*, opossum *Didelphis marsupialis*, masked titi *Callicebus personatus* (V), paca *Cuniculus paca*, agouti *Dasyprocta agouti*, yellow-legged tinamou *Crypturellus noctivagus*, mantled hawk *Leucopyernis polionota* (I), spot-winged wood-quail *Odontophorus capueira*, black and yellow rat-snake *Spilotes pullatus*, the colubrid snake *Dryadophis bifossatus*, the iguanid lizard *Urostrophus vautieri* and the horned frog *Ceratophrys dorsata* (though the titi was not found during investigations under the IUCN/WWF project).

ZONING: Intangible, Primitive, Extensive Use, Intensive Use, Cultural-Historic, Recuperation, Special Use Zones.

DISTURBANCES OR DEFICIENCIES: Uncontrolled visiting in the lower intensive zone.

SCIENTIFIC RESEARCH: Some entomological studies.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Flora and fauna lists; cartography 1:20,000 scale; aerial photographs; management plan; a study on the maned sloth *Bradypus torquatus*. Apparently a considerable bibliography exists.

STAFF: 1 director, 6 administrative staff, 12 park guards, 16 general workers.

BUDGET: Cr\$ 2,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Mario d'Amato, Director of Serra dos Orgaos National Park, Avenida Rotariana S/No Alto Teresopolis - Rio de Janeiro CEP. 25, 950.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(22) Sete Cidades National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Incomplete (90%).

DATE ESTABLISHED: 8 June 1961, by Federal Decree 50,744.

GEOGRAPHICAL LOCATION: Northeast region, State of Piauí, about 150km south-southwest of Parnaíba; 04°05'-04°15'S, 41°30'-41°45'W.

ALTITUDE: 150-300m.

AREA: 6,221 ha, but only 5,051 ha were effective in 1972. 77,000 ha were planned in the original act.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Flat plateaux of Cretaceous sandstones forming tables of soft relief on one side and precipitous cliffs on the other. The strangely eroded sandstone outcrops give the park its name from their resemblance to ancient man-made constructions. The climate is semi-arid with an annual rainfall of 1200mm, a mean temperature of 26°C and predominantly easterly winds.

VEGETATION: Grassland savanna (caatinga) and cerrado scrub are predominant, with gallery forest containing Amazonian type palms such as the buriti *Mauritia vinifera*, and *Copernicia cerifera*.

NOTEWORTHY FAUNA: Rhea *Rhea americana*, puma *Felis concolor*, black howler monkey *Alouatta caraya*, green iguana *Iguana iguana*, pit viper *Crotalus durissus*. Jorge Padua *et al* (1974) also record bearded bellbird *Procnias averano*, banded cotinga *Cotinga maculata*, maned wolf *Chrysocyon brachyurus* (V), giant anteater *Myrmecophaga tridactyla* (V), three-banded armadillo *Tolypeutes tricinctus* and pampas deer *Ozotocerus bezoarticus*, and IUCN (1977) also record ashy opossum *Marmosa cinerea*, lesser anteater *Tamandua tetradactyla*, punare *Cercomys cunicularis*, rocky cavy *Kerodon rupestris*, jaguarondi *Felis yaguaroundi* (I), brocket deer *Mazama* spp., red-legged seriema *Cariama cristata*, picazuro pigeon *Columba picazuro*, sun parakeet *Aratinga solstitialis* and tegu *Tupinambis teguixin*.

ZONING: Extensive, Intensive, Special and Recuperation Zones.

DISTURBANCES OR DEFICIENCIES: No recent information, but IUCN (1977) reported undefined boundaries, lack of staff and of access and visitor facilities.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: Base house for scientists.

PRINCIPAL REFERENCE MATERIAL: Botanical listing; management plan; cartography (1:10,000); aerial photographs; preliminary studies on the fauna.

STAFF: 1 director, 3 administrative staff, 19 park guards.

BUDGET: Cr\$ 3,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Avenida Coronel Cost Araujo, 1567 - Bairro Joquei Clube Cx. Postal 80 - 64,000 - Teresina - PI.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(23) Tijuca National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serra do mar).

LEGAL PROTECTION: Incomplete (90%).

DATE ESTABLISHED: 6 July 1961 by Federal Decree 50,925 as the Rio de Janeiro National Park, renamed 8 February 1967 when altered by Decree 60,183.

GEOGRAPHICAL LOCATION: Southeast region Rio de Janeiro state, virtually within the city of Rio de Janeiro; 22°55'-23°00'S, 43°11'-43°19'W.

ALTITUDE: 80-1,021m.

AREA: 3,300 ha, though only 2,700 ha were effective in 1972.

LAND TENURE: Part IBDF and part privately owned.

PHYSICAL FEATURES: On the slopes of the Tijuca massif which is composed predominantly of gneissic-granite rock. The park contains the Corcovado Peak on which stands the famous statue of the Redeeming Christ. Dune and beach areas.

VEGETATION: Mainly reafforested with local tropical species since 1862 when the state began to buy back the coffee plantations. These areas all look very similar to the true rainforest which covers about 5% of the area, despite their 300 years of cultivation.

NOTEWORTHY FAUNA: Includes the following, mainly reintroduced, species: ochre-marked parakeet *Pyrrhura cruentata* (R), black-fronted piping guan *Aburria jacutinga* (E), dusky-legged guan *Penelope obscura*, maned sloth *Bradypus torquatus* (E), common marmoset *Callithrix jacchus* and black-capped capuchin *Cebus apella nigrilus*. *Leontopithecus rosalia* (E) and *Alouatta fusca* (I) both occurred in the park at one time but are now extinct there. IUCN (1977) also recorded a number of primates, black-pencilled marmoset *Callithrix penicillata*, weeper capuchin *Cebus nigrivittatus*, woolly spider monkey *Brachyteles arachnoides* (E), though none of these have been reported in the recent literature. IUCN (1977) also record the three-toed sloth *B. tridactylus*, Ingram's tree squirrel *Sciurus ingrami*, tayra *Eira narnara*, Allamand's grison *Galictis vittata*, solitary tinamou *Tinamus solitarius*, channel-billed toucan *Ramphastos vitellinus ariel*, bare-throated bellbird *Procnias nudicollis*, swallow-tailed masikin *Chiroxiphia caudata*, jararaca viper *Bothrops jararaca*, a colubrid snake *Chironius carinatus*, ground boa *Tropidophis paucisquamis* and three frogs, *Ceratophrys boiei*, *Zachaeus parvulus* and *Dendrophryniscus brevipollicatus*.

ZONING: Primitive, Extensive Use, Intensive Use, Cultural-Historic, Recuperation, Special Use Zones.

DISTURBANCES OR DEFICIENCIES: The park is located in an urban area with 5 million inhabitants and suffers from uncontrolled visiting and insufficient funds.

SCIENTIFIC RESEARCH: An experimental effort to reintroduce the assai palm *Euterpes edulis*; insect studies.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Coimbra-Filho, A.F. and Aldringhi, A.O. (1972). Reestabelecimento da Fauna do Parque Nacional Tijuca. IBDF *Brasil Forestal* 11: 19-33.

Management plan, maps, species lists.

STAFF: 1 director, 20 administrative staff, 77 park guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Antonio Domingos Aldringhi, Director, Rua Major Rubens Vaz no. 122 - Rio de Janeiro - RJ CEP. 22,470.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(24) Ubajara National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.20,4 (Caatinga).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 30 April 1959, by Federal Decree 45,954 with alteration by Decree 72,144 (26 April 1973).

GEOGRAPHICAL LOCATION: Northwest region, Ceara state, 200km west of Fortaleza; 03°48'-03°51'S, 40°53'-40°55'W.

ALTITUDE: 231-870m.

AREA: 563 ha, though only 64 ha were effective in 1972 (4,000 ha were proposed in the original act).

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Limestone formations with steep cliffs and caves, on the edge of the Ibiapaba sandstone escarpment. The park is particularly noted for the Ubajara cave. Moisture-laden winds bring an annual precipitation of 1548 mm and summer temperatures range from 21°C to 16°C, when the north-east trade winds predominate.

VEGETATION: Thorny scrub of the caatinga type on the foothills, and savanna type vegetation or cerrado scrub forest on the summits. The steeper slopes in between are densely forested with many Amazonian species.

NOTEWORTHY FAUNA: Paca *Cuniculus paca*, agouti *Dasyprocta agouti*, tree porcupine *Coendu villosus*, hoary fox *Dusicyon vetulus*, white-eared opossum *Didelphis albiventris*, rock cavy *Kerodon rupestris*, tataupa tinamou *Crypturellus tataupa*, black-chested buzzard-eagle *Geranoaetus melanoleucus*. IUCN (1977) also record opossum *Didelphis marsupialis aurita*, six-banded armadillo *Euphractus sexcinctus*, tree porcupine *Coendu villosus*, cavy *Cavia aperea*, crab-eating dog *Cerdocyon thous*, crab-eating raccoon *Procyon cancrivorus*, margay *Felis weidii* (V), many parrots (Psittacidae), jararaca viper *Bothrops jararaca*, bushmaster *Lachesis muta* and tegu *Tupinambis teguixin*.

ZONING: Primitive, Extensive Use, Intensive Use, Recuperation and Special Use.

DISTURBANCES OR DEFICIENCIES: A road crosses the park; there is inadequate cave illumination, lack of general personnel and inadequate funding.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: Lodging for scientists.

PRINCIPAL REFERENCE MATERIAL: Maps; management plan; plant survey; speleological studies on the park caves.

STAFF: 1 director, 2 administrative staff, 8 park guards, 7 general workers.

BUDGET: Cr\$ 1,600,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Raimundo de Silveira C. Filho, Director of Ubajara National Park, Rodovia da Confiança (CE-75). S/No - 62.350 - Ubajara - CE.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(1) Lago Piratuba Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 16 July 1980.

GEOGRAPHICAL LOCATION: Amapa Federal Territory; 01°50'-01°27'N, 49°40'-50°30'W.

ALTITUDE: 0-200m.

AREA: 570,500 ha (Carvalho (1981) records this site as being of 395,000 ha only).

LAND TENURE: Owned by the Territory.

PHYSICAL FEATURES: Pre-Cambrian marine flats, marshy and containing the Lago Piratuba.

VEGETATION: Mangroves, grasslands, cerrado scrubland and tropical forest.

NOTEWORTHY FAUNA: Red-handed tamarin *Saguinus midas*, black-capped capuchin *Cebus apella*, probably the pale-headed saki *Pithecia pithecia*, giant anteater *Myrmecophaga tridactyla* (V), giant otter *Pteronura brasiliensis* (V), jaguar *Panthera onca* (V), puma *Felis concolor*, Caribbean manatee *Trichechus manatus* (V), American tapir *Tapirus terrestris*, harpy eagle *Harpia harpyia* (R), greater flamingo *Phoenicopterus ruber*, green turtle *Chelonia mydas* (E), spectacled caiman *Caiman crocodilus crocodilus* (V), anaconda *Eunectes murinus*, bushmaster *Lachesis muta*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Access to the reserve is difficult.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: No information.

BUDGET: Cr\$ 1,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Secretaria de Agricultura do Amapa - Av. Mendonça Furtado. 53 - Macapa - Amapa.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(2) Rio Trombetas Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Incomplete (90%).

DATE ESTABLISHED: 21 September 1979 by Federal Decree 84,018.

GEOGRAPHICAL LOCATION: Para State, 400km northeast of Manaus; 01°00'-01°45'S, 56°15'-57°05'W.

ALTITUDE: 0-100m.

AREA: 385,000 ha.

LAND TENURE: Part IBDF and part privately owned.

PHYSICAL FEATURES: River flats and small tablelands near the confluence of the Rio Trombetas and Rio Maquera, and including the Jacaré Lake.

VEGETATION: Lake vegetation, riverside forest and dense tropical forest.

NOTEWORTHY FAUNA: Black spider monkey *Ateles paniscus paniscus* (V), bare-face tamarin *Saguinus bicolor* (I), red-handed tamarin *S. midas*, common squirrel monkey *Saimiri sciureus*, black-capped capuchin *Cebus apella*, weeper capuchin *C. nigrivittatus*, pale-headed saki *Pithecia pithecia*, the black saki *Chiropotes satanas*, red howler *Alouatta seniculus*, La Plata otter *Lutra platensis* (V), giant otter *Pteronura brasiliensis* (V), giant anteater *Myrmecophaga tridactyla* (V), Amazonian manatee *Trichechus inunguis* (V), large-billed tern *Phaetusa simplex*, spotted sandpiper *Tringa macularia*, piranha *Serrasalmus bruriati* and a heavy concentration of the arraw or South American river turtle *Podocnemis expansa* (E).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Illegal hunting, insufficient reserve buildings and personnel.

SCIENTIFIC RESEARCH: Taxonomic studies of flies; biological, ecological and management studies on arraws; bat, mammal, bird and reptilian surveys; frog studies.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: The Jacaré Lake limnology maps.

Reports and publications arising from the above surveys and studies.

STAFF: 1 director, 1 administrator, 10 reserve guards, 8 general workers.

BUDGET: Cr\$ 6,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Conselheiro Furtado 1303, Belém - PA. CEP: 66,000.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(3) Jaru Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.6.1 (Madeiran).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 July 1979, by Federal Decree 83,716.

GEOGRAPHICAL LOCATION: North-east Rondonia Territory.

ALTITUDE: No information.

AREA: 268,150 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: No information.

VEGETATION: Tropical rainforest.

NOTEWORTHY FAUNA: Marsh deer *Blastocerus dichotomus* (V), black-tailed marmoset *Callithrix argentata*, common squirrel monkey *Saimiri sciureus*, dusky titi *Callicebus moloch*, white-fronted and black-capped capuchins *Cebus albifrons* and *C. apella*, dourocoulis *Aotus trivirgatus*, saki *Pithecia hirsuta*, the white-nosed saki *Chiropotes albinasus* (V), black spider monkey *Ateles paniscus* (V), red howler *Alouatta seniculus* and woolly monkey *Lagothrix lagothricha* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Access to the Reserve area is difficult.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Pinheiro Machado, 1523 - Porto Velho - Rondônia - CEP 79,000.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(4) Cara-Cara Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 28 May 1971 by Federal Decree 68,091.

GEOGRAPHICAL LOCATION: West central Mato Grosso State; 17°25'-17°53'S, 57°22'-57°41'W.

ALTITUDE: 100-350m.

AREA: 61,126 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Mato Grosso plain or 'Panatanal' consisting of marsh swamp with many lakes in an area which was once desert. On the western border are hills rising to 350 m and in the north the Reserve is bordered by the Serra do Amolar and several large lakes. Low-lying areas are subject to seasonal flooding.

VEGETATION: Extensive grassland, 'Cerrado' scrub savanna, gallery forests and areas of secondary regrowth, or capoeiras.

NOTEWORTHY FAUNA: Hyacinthine macaw *Anodorhynchus hyacinthinus*, wood stork *Mycteria americana*, Jabiru stork *Jabiru mycteria*, spectacled caiman *Caiman crocodilus*, American tapir *Tapirus terrestris*, jaguar *Panthera onca* (V), puma *Felis concolor*, tree porcupine *Coendu prehensilis*, tamandua *Tamandua tetradactyla*, cavy *Cavia aperea*, marsh deer *Blastocerus dichotomus* (V). Jorge Padua *et al* (1974) also record maned wolf *Chrysocyon brachyurus* (V), giant and La Plata otters *Pteronura brasiliensis* (V) and *Lutra platensis* (V), bush dog *Speothos venaticus* (V), giant armadillo *Priodontes giganteus* (V), giant anteater *Myrmecophaga tridactyla* (V), marsh and pampas deer *Blastocerus dichotomus* (V) and *Ozotocerus bezoarticus*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Illegal caiman hunting and smuggling, no reserve guards, insufficient ground remains above water all year to make necessary building possible. It has been suggested that the reserve should be enlarged to include the higher ground to which the animals retreat when the reserve is flooded (Schaller and Carvalho de Vasconcelos, 1976) and recent personal communications suggest this may have been done recently.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Schaller, G.B. and Carvalho de Vasconcelos, J.M. (1976).

The status of some large mammals in Goias and Mato Grosso States of Brazil. Report to IBDF.
Maps.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Jaime Figueiredo 550 - Cx. Postal no. 031 - 78,000 - Cuiaba - MT.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(5) Atol das Rocas Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.45.13 (Fernando de Noronha Island).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 5 June 1979 by Federal Decree 83,549.

GEOGRAPHICAL LOCATION: About 200km northeast of the coast of Rio Grande do Norte State; 03°45'-03°56'S, 33°37'-33°56'W.

ALTITUDE: 0-3m.

AREA: 36,249 ha.

LAND TENURE: Transferred from the Navy to IBDF ownership.

PHYSICAL FEATURES: Annular reef located in the warm equatorial currents, with two small islands of 34.6 ha and 31.5 ha. Winds blow from the east. The average air temperature is 26.8°C with easterly winds and the water temperature at the surface is 26.7°C.

VEGETATION: Ground vegetation consists of three plant species, two of which are grasses. The vegetation is heavily utilized by breeding birds.

NOTEWORTHY FAUNA: Green turtle *Chelonia mydas* (E), hawksbill turtle *Eretmochelys imbricata* (E), blue-faced booby *Sula dactylatra*, brown booby *S. leucogaster*, sooty tern *Sterna fuscata*, brown noddy *Anous stolidus*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Lack of fresh water is the main problem for the reserve administration.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Navy publications. Information can be found in various Brazilian research and educational institutes.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Rua Alexandrino de Alencar, 1399 - Caixa Postal 280 - 59,000 - Natal - RN.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(6) Sooretama Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 21 September 1943 by Federal Decree 14,977 to include the Seca Forest Reserve (IBDF Protocol 1415/70). Present status IBDF Protocol 939 (6 June 1969).

GEOGRAPHICAL LOCATION: On the coast, 120km northeast of Vitoria, southeast region of Espirito Santo; 19°10'-19°17'S, 40°00'-40°15'W.

ALTITUDE: 0-30m.

AREA: 24,000 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Flat country with Tertiary and Quaternary sediments typical of coastal Espirito Santo.

VEGETATION: The reserve protects a remnant of the tropical deciduous forest which once occupied extensive areas on this coast. There are examples of both Amazonian and littoral floras, both species of assai palm *Euterpe oleracea* and *E. edulis* occur within the reserve, and other species include *Paratecoma peroba*, the rosewood *Dalbergia nigra*, the cedar *Cedrela fissilis* and the milk tree or maçaranduba *Mimusops elata*.

NOTEWORTHY FAUNA: Masked titi *Callicebus personatus* (V), giant anteater *Myrmecophaga tridactyla* (V), maned sloth *Bradypus torquatus* (E), jaguar *Panthera onca* (V), giant otter *Pteronura brasiliensis* (V), giant armadillo *Priodontes giganteus* (V), solitary tinamou *Tinamus solitarius*, racket-tailed coquette *Discosura longicauda*, red-billed curassow *Crax blumenbachi* (E). Jorge Padua *et al* (1974) also record thin-spined porcupine *Chaetomys subspinosus* (I), harpy eagle *Harpia harpyia* (R), black hawk-eagle *Spizaetus tyrannus*, black-fronted piping guan *Aburria jacutinga* (E), banded and white-winged cotingas *Cotinga maculata* and *Xipholena atropurpurea* (V), and the large-billed and lesser seed finches *Oryzoborus crassirostris* and *O. angolensis*. IUCN (1977) record yapok *Chironectes minimus*, collared peccary *Tayassu tajacu*, yellow-legged tinamou *Crypturellus noctivagus*, red-breasted toucan *Ramphastos dicolorus*, bushmaster *Lachesis muta* and wood tortoise *Geochelone denticulata*. IUCN (1977) also note that many humming birds (Trochilidae) have been identified in the area.

ZONING: Special Use, Recuperation, Integral Protection, Primitive and Conflict Use Zone.

DISTURBANCES OR DEFICIENCIES: Lack of personnel and financial resources for maintenance and conservation; illegal hunting; a federal highway which passes through the park.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Cartography (1:50,000); aerial photographs; management plan.

STAFF: 1 director, 22 park guards, 3 general workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Gilberto Freire de Matos - Director, esquerda a 35 km Linhares - ES - CEP. 29,900. Telephone: 3-00113 (0272).

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(7) Una Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.7.1 (Serra do mar).

LEGAL PROTECTION: Partial (35%).

DATE ESTABLISHED: 10 December 1980.

GEOGRAPHICAL LOCATION: Bahia State, 150 km south-southwest of Salvador; 15°05'-15°15'S, 39°00'-30°15'W.

ALTITUDE: 40-123m.

AREA: 11,400 ha.

LAND TENURE: Part IBDF and part privately owned.

PHYSICAL FEATURES: Hillside country and flats.

VEGETATION: Tropical forest.

NOTEWORTHY FAUNA: One of the principal reasons for establishing the reserve was to protect the golden-headed lion tamarin *Leontopithecus chrysomelas* (E) and thin-spined porcupine *Chaetomys subspinosus* (I). The area also contains puma *Felis concolor*, cavy *Cavia aperea*, parrots of the genus *Amazona*, *Lachesis* sp. and perhaps the masked titi *Callicebus personatus melanochir* (V), black-capped capuchin *Cebus apella xanthosternos* and the marmoset *Callithrix kuhlii*. All four species of monkey are apparently at quite low densities.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Invasion for cocoa planting and timber exploitation has probably affected about half of the reserve (see WWF/IUCN Project 1614). Lack of sufficient personnel.

SCIENTIFIC RESEARCH: Floristic studies carried out by the Botany Department, Centro de Pesquisas do Cacau, Itabuna, BA.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: 4 reserve guards, 1 general worker.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Ed. Suerdick, Av. Estados Unidos 14, salas 405 a 407, 40,000 Salvador BA.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(8) Poço das Antas Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Incomplete (65%).

DATE ESTABLISHED: 11 March 1974 by Federal Decree 73,792, and added to in 1975.

GEOGRAPHICAL LOCATION: Southeast region, Rio de Janeiro state, 120km east of Rio de Janeiro, in the coastal foothills of the Serra do Mar; 22°30'-22°33'S, 42°15'-42°19'W.

ALTITUDE: 0-198m.

AREA: 5,063 ha (originally 3,000 ha).

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: The topography is relatively flat with small valleys and low hills, composed of Pre-Cambrian granites and gneisses with deep latosolic decomposition into silty sand soils on the hills, while in the valleys there is a covering of Quaternary hydromorphic soils. Climate is tropical with a warm wet season from October to April, and rainfall concentrated in June, July and August when Atlantic air masses reduce the average air temperatures.

VEGETATION: Atlantic tropical rainforest, rich in species.

NOTEWORTHY FAUNA: The reserve was declared to protect the endangered golden lion tamarin *Leontopithecus rosalia rosalia*. Green (1980) believed that the reserve had a population of at the most 75 animals. Woolly spider monkey *Brachyteles arachnoides* (E), brown howler monkey *Alouatta fusca clamitans* (I), black-capped capuchin *Cebus apella nigritus*, maned sloth *Bradypus torquatus* (E), black-eared parrotlet *Touit melanonota*, solitary tinamou *Tinamus solitarius*, black-fronted piping guan *Aburria jacutinga* (E), small-billed tinamou *Crypturellus parvirostris* and dusky-legged guan *Penelope obscura*. IUCN (1977) also include the pampas and marsh deer *Blastocerus dichotomus* (V) and *Ozotocerus bezoarticus*, but considering the disturbances detailed below it is possible that these species are no longer to be found in the reserve.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: There is inadequate protection, a railroad and highway cut through the reserve, and a dam under construction which will flood a significant part of the area. The dam construction is also having a deleterious effect on the park. There are also land tenure problems and farming activities which prevent forest regeneration. It would seem likely that unless there is a major effort to improve protection of this reserve in the near future the animal for which it was declared will become extinct in the wild.

SCIENTIFIC RESEARCH: Butterfly studies.

SPECIAL SCIENTIFIC FACILITIES: No information, but a centre was certainly planned.

PRINCIPAL REFERENCE MATERIAL: Management plan, map, lion marmoset studies, mammal survey.

Green, K.M. (1980). An assessment of the Poco das Antas Reserve, Brazil, and prospects for survival of the golden lion tamarin *Leontopithecus rosalia rosalia*. Unpd. report.

Thornback, J. and Jenkins, M. (1982). *The IUCN Mammal Red Data Book* Part 1. IUCN, Gland. Project reports for IUCN/WWF Project 1614 (Mittermeier *et al*).

STAFF: A director based in Rio de Janeiro, 8 reserve guards, 2 general workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Dionizio Moraes Pessamilio - Diretor, Rua Pacheco Leao, 2040 Rio de Janeiro - CEP. 20,020.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(9) Nova Lombardia Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Total, with no tourists allowed within the area.

DATE ESTABLISHED: 20 September 1948 under Estate Decree 55, given to government by Espírito Santo State Law 976 (10 December 1955), now under IBDF Protocol 1414 (17 April 1970).

GEOGRAPHICAL LOCATION: Southeast region, Espírito Santo State, 50km northwest of Vitória; 19°46'-19°55'S, 40°30'-40°35'W.

ALTITUDE: 500-1,200m.

AREA: 4,350 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: Very broken terrain with steep slopes and shallow soils in the northernmost bastion of the Serra do Mar.

VEGETATION: Semi-deciduous tropical rainforest, with about 85% of the Bromeliaceae and Orchidaceae found in Espírito Santo present within the park.

NOTEWORTHY FAUNA: Red-capped parrot *Pionopsitta pileata*, racket-tailed coquette *Discosura longicauda*, brown violet-ear *Colibri delphinae granwalli*, hooded visor-bearer *Augastes lumachellus* and large-billed seed finch *Oryzoborus crassirostris*. The reserve also protects one of the largest populations of the buffy-headed marmoset *Callithrix flaviceps* (E) which is endemic to this part of Brazil, the masked titi *Callicebus personatus* (V), the brown howler monkey *Alouatta fusca* (I), the black-capped capuchin *Cebus apella nigrinus*, and possibly also the woolly spider monkey *Brachyteles arachnoides* (E). Maned sloth *Bradypus torquatus* have also been recorded from the park, as have thin-spined porcupine *Chaetomys subspinosus* (I) and lesser seed finch *Oryzoborus angolensis* (Jorge Padua *et al.*, 1974). IUCN (1977) also record solitary tinamou *Tinamus solitarius* and black-fronted piping guan *Aburria jacutinga* (E).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Insufficient personnel and funding.

SCIENTIFIC RESEARCH: Survey of marmoset population as part of IUCN/WWF project 1614.

SPECIAL SCIENTIFIC FACILITIES: Some limited facilities exist.

PRINCIPAL REFERENCE MATERIAL: Aerial photographs.

STAFF: 1 director, 1 administrator, 4 reserve guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Estrada de Santa Tereza a Nova Lombardia Km 7 - Santa Tereza - ES, CEP - 29650. Telephone: 3-0013.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(10) Corrego do Veados Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: September 1948 by State Decree 55, passed to Federal Government by State Law 976 (10 December 1955), then given present status under IBDF Protocol 1415 (17 April 1970).

GEOGRAPHICAL LOCATION: Southeast region, northern Espírito Santo; 18°19'-18°31'S, 40°11'-40°14'W.

ALTITUDE: 0-100m.

AREA: 2,400 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: The area is flat with sandy soils.

VEGETATION: Semi-deciduous tropical rainforest with large trees and low density subforest. Coastal dunes. The reserve protects important stands of a number of timber trees including *Paratecoma peroba*, the rosewood or jacaranda *Dalbergia nigra*, *Platymenia reticulata* and *Astronium fraxinifolium*.

NOTEWORTHY FAUNA: The fauna is similar to that of Sooretama Reserve and includes maned sloth *Bradypus torquatus* (E), giant anteater *Myrmecophaga tridactyla* (V), giant otter *Pteronura brasiliensis* (V), white-fronted marmoset *Callithrix geoffroyi*, black-capped capuchin *Cebus apella robustus*, solitary tinamou *Tinamus solitarius*, black-fronted piping guan *Aburria jacutinga* (E) and hook-billed hermit *Ramphodon dohrnii* (E). Jorge Padua *et al* (1974) also record harpy eagle *Harpia harpyia* (R), red-billed curassow *Crax blumenbachii* (E), racket-tailed coquette *Discosura longicauda*, banded cotinga *Cotinga maculata* (V), white-winged cotinga *Xipholena atropurpurea* (V), large-billed and lesser seed finches *Oryzoborus crassirostris* and *O. angolensis* and the onychophoran *Peripatus*, which IUCN (1977) records as being represented by several species.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Insufficient employees and lack of infrastructure.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Aerial photographs.

STAFF: 1 technician, 2 park guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Antiga Estrada Pinheiro a Conceição da Barra Km 17 - Pinheiros - ES. CEP: 29,980. Telephone: 3-0013 (0272).

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(11) Serra Negra Federal Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.20.4 (Caatinga).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 7 July 1950 as a Forest Reserve by Federal Decree 28,348, present status under IBDF Protocol 1416 (17 April 1970).

GEOGRAPHICAL LOCATION: Northeast region of Pernambuco State, 350km west of Recife; 08°37'-08°45'S, 37°56'-38°05'W.

ALTITUDE: 800-950m.

AREA: 1,100 ha.

LAND TENURE: Owned by IBDF.

PHYSICAL FEATURES: The park is located on an isolated upland block or inselberg, where there are remnants of a primitive forest.

VEGETATION: Tropical forest island, surrounded by 'caatinga' thorn savanna with water sources, or brejos.

NOTEWORTHY FAUNA: Savanna hawk *Heterospizias meridionalis*, little chachalaca *Ortalis motmot guttata*, rusty-margined guan *Penelope superciliaris* and ocelot *Felis pardalis* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Lack of personnel and reserve buildings.

SCIENTIFIC RESEARCH: Investigations of flora and fauna from Recife University.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No information.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Delegacia Estadual do IBDF en Pernambuco, Av. 17 de agosto, 1057 - Casa Forte - 50,000 - Recife - PE.

NAME OF CNPPA COORDINATOR: Maria Tereza Jorge Padua.

INFORMATION DATED: 20 May 1981.

(1) Anavilhanas Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: North region, Amazonas State, 100km northwest of Manaus; 02°00'-03°02'S, 60°27'-61°07'W.

ALTITUDE: 0-50m.

AREA: 350,000 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: An archipelago in the Rio Negro about 90km long and 15km wide at the widest point, with an area of 'terra firma' of about 250,000 ha to the north. The archipelago is almost completely flooded in the rainy season.

VEGETATION: Humid lowland forest ecologically divided into 'terra firma' forest and marshy forest. The forest bordering the stream is subject to partial inundation which affects the floristic content. This is known as igapo. On the high ground the forest gives way to a more savanna type of vegetation with lichens and groves of palms (Campinararmas).

NOTEWORTHY FAUNA: Amazonian manatee *Trichechus inunguis* (V), capybara *Hydrochoerus hydrochaeris*, collared peccary *Tayassu tajacu*, black spider monkey *Ateles paniscus paniscus* (V), red-handed tamarin *Saguinus midas*, common squirrel monkey *Saimiri sciureus*, black-capped capuchin *Cebus apella*, weeper capuchin *C. nigrivittatus*, douroucoulis *Aotus trivirgatus*, pale-headed saki *Pithecia pithecia*, black saki *Chiropotes satanas*, red howler *Alouatta seniculus* and broad-nosed cayman *Caiman latirostris* (E).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Some deforestation.

SCIENTIFIC RESEARCH: River manatee project based in Manaus; termite survey; ichthyofauna survey.

SPECIAL SCIENTIFIC FACILITIES: There is lodging available for scientists and a laboratory.

PRINCIPAL REFERENCE MATERIAL: Radar images; maps; research reports.

STAFF: 1 administrator, 2 park guards, 1 general worker.

BUDGET: Cr\$ 3,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar, Esplanada dos Ministérios, Projecao 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(2) Iquê Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: Mid-west region, Mato Grosso State, 500km northwest of Cuiaba; 11°30'-12°02'S, 58°04'-59°53'W.

ALTITUDE: 0-400m.

AREA: 200,000 ha (Carvalho (1981) records the size of this reserve as 220,000 ha).

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: Undulating high plain, including part of the Serra do Norte, and part of the northern bank of the upper Jururena River (a tributary of the River Tapajos) and the Iquê River. Sandy soils unfit for agriculture.

VEGETATION: Mainly cerrado with tropical Amazon forest along the river.

NOTEWORTHY FAUNA: Jaguar *Panthera onca* (V), giant otter *Pteronura brasiliensis* (V), black spider monkey *Ateles paniscus* (V), common squirrel minkey *Saimiri sciureus*, dusky titi *Callicebus moloch*, black-capped capuchin *Cebus apella*, white-fronted capuchin *C. albifrons*, douroucoulis *Aotus trivirgatus*, the saki *Pithecia hirsutus*, red howler *Alouatta seniculus* and woolly monkey *Lagothrix longothricha* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: Termite survey.

SPECIAL SCIENTIFIC FACILITIES: There is lodging available for scientists and a laboratory.

PRINCIPAL REFERENCE MATERIAL: Maps and research reports.

STAFF: 1 administrator, 2 park guards, 3 general workers.

BUDGET: Cr\$ 2,730,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projecao 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(3) Uruçui - Una Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.20.4/8.30.10 (Caatinga/Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: Southwest region, Piauí State, 250km southwest of Floriano; 8°37'-9°10'S, 44°55'-45°30'W.

ALTITUDE: 0-400m.

AREA: 135,000 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: Plateau in the Serra do Uruçui, between the Uruçui and Riozinho Rivers. The area is characterised by large plateaux, valleys and intermittent rivers. Sandstone escarpments, sometimes reaching 80m.

VEGETATION: Cerrado on the plateaux with areas of dry scrubby caatingas. Gallery forests along the rivers with some palm species.

NOTEWORTHY FAUNA: Puma *Felis concolor*, white-lipped peccary *Tayassu pecari*, giant armadillo *Prionomys giganteus* (V). Also recorded are giant anteater *Myrmecophaga tridactyla* (V), maned wolf *Chrysocyon brachyurus* (V), muscovy duck *Cairina moschata*, Marcgrave's black-winged bellbird *Procnias averano*, lesser seed finch *Oryzoborus angolensis*, large-billed seed finch *O. crassirostris*, rhea *Rhea americana*, caymans *Caiman* spp., turtles *Testudo tabulata*, pit vipers *Bothrops jararaca* and rattlesnakes *Crotalus terrificus* (SEMA 1977).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Maps and research reports.

STAFF: 1 administrator, 2 park guards, 1 general worker.

BUDGET: Cr\$ 6,010,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projeto 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(4) Maraca Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.28.10 (Campos Limpos).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: North region, Roraima Federal Territory, 100km northwest of Boa Vista; 3°15'-35'N, 61°22'-58'W.

ALTITUDE: Less than 100m.

AREA: 92,000 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: The area includes parts of the Rio Uraricuera and Rio Uraricaa, and a large island within the Rio Uraricuera on the edge of the Guiana Highlands. The island is periodically flooded.

VEGETATION: Transition zone between grasslands and tropical Amazon forest. Dense formations of buriti palms *Mauritia vinifera* and swamps covered with luscious hydrophilous vegetation due to the high water levels. Also found are rosewood *Ariba* sp., itauba *Mezilaurus* sp., laurel *Ocotea*, jenny wood *Cordia goeldiana* and cedrela *Cedrela* sp. There are also a number of interesting bromeliads and orchids.

NOTEWORTHY FAUNA: Giant anteater *Myrmecophaga tridactyla* (V), jaguar *Panthera onca* (V), black spider monkey *Ateles paniscus* (V), red-handed tamarin *Saguinus midas*, widow monkey *Callicebus torquatus*, black-capped capuchin *Cebus apella*, weeper capuchin *C. nigrivittatus*, pale-headed saki *Pithecia pithecia*, black saki *Chiropotes satanas*, black-headed uakari *Cacajao melanocephalus* (V), red howler *Alouatta seniculus*, collared peccary *Tayassu tajacu* and various parrots (Psittacidae). Giant otters *Pteronura brasiliensis* (V), tapirs *Tapirus terrestris*, caymans *Caiman* spp. have also been recorded (SEMA 1977), as have scarlet macaw *Ara macao*, ring-tailed coati *Nasua nasua*, white-fronted capuchin *Cebus albifrons*, woolly monkey *Lagothrix lagithricha* (V), common squirrel monkey *Saimiri sciureus*, great egret *Egretta alba*, black-crowned night heron *Nycticorax nycticorax*, Jabiru stork *Jabiru mycteria* and the snake *Boa constrictor* (Marigo, 1979).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Minor modifications by man.

SCIENTIFIC RESEARCH: Studies on blackflies (Simuliidae).

SPECIAL SCIENTIFIC FACILITIES: There is lodging available for scientists and a laboratory.

PRINCIPAL REFERENCE MATERIAL: Marigo, L.C., (1979). Estacao Ecologica de Maraca-Roraima, *Revista Geografica Universal* (Edicao especial). Secretaria Especial do Meio Ambiente (SEMA).

Maps, research reports.

STAFF: 1 administrator, 3 park guards, 2 general workers.

BUDGET: Cr\$ 4,500,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecologicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projecao 23 - Brasilia - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(5) Rio Acre Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: North region, Acre State, on the borders with Peru and Bolivia; 10°45'-11°05'S, 70°00'-30'W.

ALTITUDE: 0-200m.

AREA: 77,500 ha (Carvalho (1981) records the size of this reserve as 73,000 ha).

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: Plateau in the foothills of the Andes.

VEGETATION: Palms, open tropical Amazon forest with bamboo substratum.

NOTEWORTHY FAUNA: Jaguar *Panthera onca* (V), pygmy marmoset *Cebuella pygmaea*, black spider monkey *Ateles paniscus* (V), sloths *Bradypus* spp., giant otter *Pteronura brasiliensis* (V), capybara *Hydrochoerus hydrochaeris*, South American river turtle or arraw *Podocnemis expansa* (E), black cayman *Melanosuchus niger* (E), great white egret *Egretta alba*, Jabiru stork *Jabiru mycteria*, harpy eagle *Harpia harpyia*(R) and razor-billed curassow *Mitu mitu*.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: 'Estudos Iniciais de Implantação da Estação Ecológica do Rio Acre'.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projecão 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(6) Maraca-Jipioca Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: North region, Amapá Federal Territory, just north of the Mouths of the Amazon; 1°50'-2°15'N, 50°17'-40'W.

ALTITUDE: 0-50m.

AREA: 70,000 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: The Maraca-Jipioca Islands are of Quaternary age with muddy, monotonous, flat landscapes. There are no beaches and the water is muddy.

VEGETATION: Tropical forest on the 'Têsos', mangroves and flooded grasslands. 30% of the South Maraca island is covered by mangroves (which protect the eastern shore) as is all of Jipioca Island.

NOTEWORTHY FAUNA: Greater flamingo *Phoenicopterus ruber*, jaguar *Panthera onca* (V), roseate spoonbill *Platalea ajaja*, scarlet ibis *Eudocimus ruber*, Caribbean manatee *Trichechus manatus* (V), red brocket deer *Mazama americana*, giant anteater *Myrmecophaga tridactyla* (V), capybara *Hydrochoerus hydrochaeris*, black-capped capuchin *Cebus apella*, common squirrel monkey *Saimiri sciureus*, black cayman *Melanosuchus niger* (E).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Modification by man in clearing fields, and in fishing.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: Lodging is available for scientists.

PRINCIPAL REFERENCE MATERIAL: Radar images; maps; 'Estudos de Implantação da Estação Ecológica Maraca-Jipoca, (1978).

STAFF: 1 administrator, 3 park guards.

BUDGET: Cr\$ 8,000,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projeto 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(7) Taiama Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: Mid-west Mato Grosso State, 250km southwest of Cuiaba; 16°50'S, 57°23'-30'W.

ALTITUDE: 0-50m.

AREA: 12,000 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: In the basin of the upper Rio Paraguai.

VEGETATION: Pantanal of the Mato Grosso type.

NOTEWORTHY FAUNA: *Dracaena paraguayensis*, broad-nosed cayman *Caiman latirostris* (E), capybara *Hydrochoerus hydrochaeris*, giant otter *Pteronura brasiliensis* (V) and marsh deer *Blastocerus dichotomus* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Minor modifications by man.

SCIENTIFIC RESEARCH: Soil survey; preliminary faunal survey; morphometric characterization of vegetation.

SPECIAL SCIENTIFIC FACILITIES: There is lodging available for scientists and a laboratory.

PRINCIPAL REFERENCE MATERIAL: Maps and research reports.

STAFF: 1 administrator, 3 park guards, 2 general workers.

BUDGET: Cr\$ 110,200 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - Projeto 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

(8) Aracuri-Esmeralda Ecological Station

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 2 June 1981.

GEOGRAPHICAL LOCATION: South region, Rio Grande do Sul state, 90km south of Florianopolis; 28°12'-28'S, 51°10'-11'W.

ALTITUDE: 0-1,200m.

AREA: 272 ha.

LAND TENURE: Owned by SEMA.

PHYSICAL FEATURES: Mountain region within the Serra do Mar with excessive gravel and shallow soil, due largely to wind erosion. The site is relatively close to the coast, and rainfall averages between 1,550 and 2,500mm, falling throughout the year. Annual average temperature of 17.1°C.

VEGETATION: Native grasslands with isolated clumps of *Araucaria angustifolia* forest which also contain cinnamon-bark trees *Ocotea* spp. and *Nectandra* spp. These clumps are normally found on the lowlands where the soil is more fertile.

NOTEWORTHY FAUNA: Red-spectacled parrot *Amazona petrei* which congregate in these forests every year to feed on the *Araucaria* seeds. Agouti *Dasyprocta agouti*, brocket deer *Mazuma* spp., tapiti *Sylvilagus brasiliensis* and 140 species of bird including the azure jay *Cyanocorax coerulea* have also been recorded (SEMA, 1977).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Some deforestation took place before the acquisition of the area by SEMA.

SCIENTIFIC RESEARCH: Hemiptera survey; investigation of vertebrate biotic communities; cytotaxonomic and cytogenic studies of Rodentia; genetic and ecological studies on Lepidoptera; abundance and distribution of vascular epiphyta; action of fire on young *Araucaria* community; systematics, ecology and evolution of South American plant genera.

SPECIAL SCIENTIFIC FACILITIES: There is lodging available for scientists and a laboratory.

PRINCIPAL REFERENCE MATERIAL: Aerial photographs; maps; research reports.

STAFF: 1 research director, 1 administrator, 2 park guards, 4 general workers.

BUDGET: Cr\$ 2,600,000 in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: SEMA - Coordenadoria de Estações Ecológicas - Ministério do Interior - 2º Andar - Esplanada dos Ministérios - projeção 23 - Brasília - DF.

NAME OF CNPPA COORDINATOR: Paulo Nogueira Neto.

INFORMATION DATED: 9 July 1981.

CHILE

AREA: 756,943 sq km.

POPULATION: 11,390,190 (1981).

PARKS AND RESERVES LEGISLATION: The Law of Woodlands, Supreme Decree 4363 of 1931, and the Forest Law, Decree 656 of 1925, enabled the government to establish national parks and other reserves with the purpose of protecting certain species of tree, and conserving scenic beauty. Supreme Decree 531 of 1967 (of the Ministerio de Relaciones Exteriores) subsequently defined National Parks and other reserves and specified their roles, conforming with the Convention on Nature Protection and Wildlife Preservation in the Western Hemisphere (Washington, 1940). Chilean conservation units have undergone a recent reorganisation and consolidation.

PARKS AND RESERVES ADMINISTRATION: Legal responsibility for the protected areas as vested on the Agrícola y Ganadero of the Ministerio de Agricultura. Nevertheless this organisation, through a 1971 agreement, delegates administration to the Corporacion Nacional Forestal (CONAF). National Parks are large areas protected by the highest competent authority which have not been significantly altered by exploitation, and in which animal and plant species, geomorphological sites, or habitats are of special scientific, educational and/or recreational interest. They may also contain areas of high landscape value. National Monuments are regions, objects or living species of either historic or scientific value, or of aesthetic interest, which are protected absolutely. Scientific Reserves are areas specifically established for their natural resources research potential. There are also National Fauna Refuges and Forest Reserves.

ADDRESS: Corporacion Nacional Forestal, Departamento de Conservacion del Medio Ambiente, Av. Bulnes 285, Santiago de Chile.

REFERENCES: Araya, P. (1976). Criterios y Metodologia para enfrentar la Investigacion en los Parques Nacionales de Chile. Depto. Conser. del Medio Ambiente, CONAF, Chile.

TOTAL AREA UNDER PROTECTION: 3,084,588 ha.

PROTECTED AREAS:

National Parks		(hectares)
1	Laguna San Rafael	1,350,123
2	Lauca	520,000
3	Vicente Perez Rosales	220,000
4	Torres del Paine	163,000
5	Puyehue	104,017
6	Villarrica	65,400
7	Cape Horn	63,093
8	Los Paraguas and Conguillo	46,000
9	Juan Fernandez	18,300
10	Isla Guamblin	10,625
11	La Campana	10,000
12	Fray Jorge	9,959
13	Rapa-Nui	6,800
14	Nahuelbuta	5,932
15	Pali Aike	3,000
National Reserves		
1	Cerro Castillo	179,550
2	Nuble	55,948
3	Alto Bio-Bio	35,190
4	Malalcahuello	29,530
5	Laguna Parrillar	20,814

6 Nalcas	-	13,775
7 Magallanes		13,500
8 China Muerta		11,168
9 Lago Penuelas		9,095
10 Coyhaique		2,150

National Monuments

1 Los Alerzales	1,230
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Biosphere Reserves

1 Laguna San Rafael*	(1,380,613)
2 Lauca	(520,000)
3 Torres del Paine	(163,000)
4 Juan Fernandez	(18,300)
5 Fray Jorge	(9,845)

* This area includes Laguna San Rafael National Park and the former El Guayaneco National Park.



Key

- NATIONAL PARKS
- △ NATIONAL MONUMENTS
- ◁ BIOSPHERE RESERVES

(1) Laguna San Rafael National Park

MANAGEMENT CATEGORY: II & IX (National Park and Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.10.2 (Valdivian Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1959 (Supreme Decree 457).

GEOGRAPHICAL LOCATION: Located in General Carrera and Capitan Prat Provinces; 46°39'S, 73°32'W.

ALTITUDE: 0-4,058m.

AREA: 1,350,123 ha.

LAND TENURE: National.

PHYSICAL FEATURES: Approximately a third of the park consists of northern Patagonian fields. The climate is harsh with 3,000mm of rain a year and a mean temperature of 8°C.

VEGETATION: Dominated by *Nothofagus pumilio* forests, *Pilgerodendron uvifera* and evergreen forests composed of *Nothofagus nitida*, *Laurelia philippiana*, *Weinmania trichosperma*, *Podocarpus nubigenus* and *Drimys winteri*, together with other tree species.

NOTEWORTHY FAUNA: Among the mammals present are *Lutra provocax* (I), *Pudu pudu*, puma *Felis concolor* and fox *Dusicyon* sp. The avifauna is diverse and includes the black-necked swan *Cygnus melancoryphus* and ducks such as *Anas georgica*, *A. flavirostris* and *A. silibatrix*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: Some preliminary studies have been carried out on flora, fauna and the geological history of the glaciers.

SPECIAL SCIENTIFIC FACILITIES: A meteorological station has been built recently. An old hotel which has been partially destroyed will be used for future studies.

PRINCIPAL REFERENCE MATERIAL: Heuser, C. (1961). American Geographical Society Southern Chile Expedition in 1959. Am. Geog. Soc. No. 4.

Lawrence (1961). Recent glacial variations in South America. Technical Report. Am. Geog. Soc. No. 4.

Universidad de Chile de Valparaiso (1978). Tripologia de la vegetacion y caracterizacion de la fauna del Parque Nacional San Rafael.

STAFF: Two park guards.

BUDGET: For personnel, administration, patrols and preliminary development studies.

LOCAL PARK OR RESERVE ADMINISTRATION: Mario Vildosola Y., Corporacion Nacional Forestal XI Region, Casilla 412, Coyhaique, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 12 June 1981.

(2) Lauca National Park

MANAGEMENT CATEGORY: II & IX (National Park & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Originally the Lauca Forest Reserve, but declared a National Park of Tourism on 11 August 1970 (Decree 270, Ministry of Agriculture).

GEOGRAPHICAL LOCATION: 160km from Arica in the province of Paninacota; 18°30'S, 69°15'W.

ALTITUDE: 2,000-6,350m.

AREA: 520,000 ha.

LAND TENURE: National, except for a few indigenous inhabitants.

PHYSICAL FEATURES: A high plateau, with an average altitude of 4,500m. There are important watersheds in the park, with rivers flowing both into the Pacific Ocean and down into Bolivia. An arid climate, with mean temperatures of between 4 and 5°C. Mean annual temperature is 1°C at an altitude of 4400m. Mean annual precipitation is 335.5mm at the same altitude.

VEGETATION: The park has three dominant vegetation types: tolar *Baccharis tola*, *Fabiana*, *Chuquiraga* and *Mutisia*, *Polylepis tarapacana* and cacti (*Opuntia* and *Cereus*); Andean steppe, with two associations, the perennial Andean meadowland with the genus *Oxycloe* dominant, associated with *Gentiana*, *Hipchoeris*, *Hysela* and various members of the Gramineae (of xerophytic nature); and llaretal, characterized mainly by *Laretia* spp. with examples of *Polylepis tarapacana*.

NOTEWORTHY FAUNA: There are 150 species of birds, notably giant coot *Fulica gigantea*, Andean gull *Larus serranus* and 3 species of flamingoes. Among the mammals are diverse rodent species, yet few carnivores. The most abundant mammal is the guanaco *Lama guanicoe*, together with the domestic llama *Lama glama*, domestic alpaca *Lama pacos*, the vicuna *Vicugna vicugna* (V) and the northern huemul *Hippocamelus antisensis* (V).

ZONING: Primitive zone (17.2%), Extensive Use zone (18.2%), Intensive Use zone (9.4%), Historic/Cultural zone (48%), Recuperation zone (5.2%), and Special Use zone (2%).

DISTURBANCES OR DEFICIENCIES: Some areas are affected by human use; canals and the construction of railroads has caused erosion. These correspond to the zone classified as the natural recuperation zone.

SCIENTIFIC RESEARCH: Most research has been done on the vicuna, but it is sporadic. The management plan and proposed programme are complete.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Torres, H., Hernandez, L. and Weber, C. (1978). Management Plan for Lauca National Park. Technical Publication No. 5. CONAF, Santiago, Chile.

STAFF: 1 Administrator and 2 park guards.

BUDGET: Solely for observation and enforcement of park rules.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Regional, Corporacion Nacional Forestal, Arica, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 10 June 1981.

(3) Vicente Perez Rosales National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.11.2 (Chilean *Nothofagus*).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1926 (Decree 552, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: In the province of Llanquihue; 41°S, 72°W.

ALTITUDE: 100-3,554m.

AREA: 220,000 ha.

LAND TENURE: 19% of the area is privately owned.

PHYSICAL FEATURES: The park includes a series of volcanoes and a total of 14 independent water systems, draining principally to Lake Todos los Santos. There is a cold temperate climate, with mean annual precipitation around 4,000mm.

VEGETATION: Predominantly evergreen forests, including damp woodland with an upper storey of *Nothofagus dombeyi* and woodlands of *Aextoxicon punctatum* and *N. dombeyi*. The lower storeys are heterogenous and variable, predominantly Myrtaceae.

NOTEWORTHY FAUNA: Not very abundant, though diverse. 33 species of mammals and 117 species of birds have been identified, some in concentrated populations. Most are typical species of the region, though the park does contain some subspecies due to transitions in latitudinal distribution - examples include *Felis concolor araucana* and *F. c. patagonicus*.

ZONING: According to the management plan, 85% of the park is a primitive zone. There are also extensive use, natural recuperation, intensive use and special use zones. Proposed boundary changes are currently being studied.

DISTURBANCES OR DEFICIENCIES: The main management problems are in the central zone of the park. Privately owned lands must be used in conjunction with the objectives of the park.

SCIENTIFIC RESEARCH: Scarce. Sporadic efforts are made to investigate the flora and fauna. Recently there have been some general studies of the limited resources.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Oltremari, J., Paredes, G., Martinex, O. and Real, P. (1981). Redelimitacion y reclasificacion de parques nacionales y reservas forestales. Aplicacion al Parque Nacional Vicente Pérez Rosales y a las Reservas de Chiloé. Proyecto PNUD/CONAF/FAO. Santiago de Chile.

STAFF: 3 park guards.

BUDGET: For patrols, and staff salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Gerardo Elzo, Corporacion Nacional Forestal, X Region, Puerto Montt, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(4) Torres del Paine National Park

MANAGEMENT CATEGORY: II & IX (National Park & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.37.12/8.11.2 (Southern Andean/Chilean *Nothofagus*)

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 13 May 1959 by Supreme Decree 383, and extended by Supreme Decree 90 (13 March 1975). April 1978 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: Named after three rocky peaks in the Paine mountain mass, this park is located in the province of Ultima Esperanza, 142km north of Puerto Natales. Bounded to the north by Argentina, to the south by Puerto Natales, to the east by the Bernardo O'Higgins National Park, and to the west by cattle pastures; 49°21' - 51°08'S, 73°07' - 74°52'W.

ALTITUDE: 200-2,346m, with a lot of the land over 2,000m.

AREA: 163,000 ha.

LAND TENURE: Owned by the Chilean government and administered by the National Forest Corporation (CONAF). There is a single private holding (Cerro Paine).

PHYSICAL FEATURES: A region of extensive plains, with many ridges, crags, glaciers, waterfalls, rivers, lakes and lagoons. The Grey, Tyndall and Balmaceda glaciers are remains of a system once much more extensive. They are still retreating, the most spectacular retreat being that of the glacier feeding Lake Dickson (an average of 17m a year between 1897 and 1943). Annual precipitation ranges from 250-1500mm. There are strong winds in summer. Mean monthly temperatures in the Rio Paine sector range from 2.6-10.4°C but this area, having a distinct microclimate, cannot be considered as representative.

VEGETATION: The tablelands and plains in the west are part of the Patagonian-Fuegian steppe. Those areas where lenga *Nothofagus pumilio* is present appear to be part of the evergreen forests of Verano, and extend to the west as far as the foot of the mountains. The mountain areas belong to the alpine treeless zone. The following are the most widespread plant associations, arranged according to biotic province. Pre-Andean scrublands: Pre-Andean xerophytic scrub association, *Mulinetum spinosi*; mesophytic scrub association, *Escallonieta rubri*; dwarf shrub dysclimax association, *Pernettyetum mucronati*. Magellanic deciduous forests: Magellanic deciduous forest association, *Nothofagetum pumilionis*; Magellanic mixed forest association of *Nothofagus pumilio* and *N. betuloides*. Patagonian steppe: Patagonian steppe association. *Festucetum gracillimi*; association of *Festuca gracillima* and *Baccharis magellanica*; scrub association of Mata Negra, *Verbenetum tridentis*; also halophytic and meadow communities. Andean desert: desert and sub-desert communities.

NOTEWORTHY FAUNA: There are about 106 species of birds, some of which are endangered in Chile, such as *Coscoroba coscoroba* and *Pterocnemis pennata*. *Agelaius thilius* has only recently been discovered in the Cape Ultima Esperanza area. The most representative birds are *Geranoaetus melanoleucus*, *Buteo polyosoma*, *Polyborus plancus*, *Camphephilus magellanicus*, *Falco sparverius*, *Vultur gryphus*, *Falco peregrinus*, *Anas sibilatrix*, *Cygnus melancoryphos*, *Phoenicopterus chilensis*. There are 24 species of mammals: the bats *Myotis chiloensis* and *Histiotus montanus*, the edentates *Zaedyus pichiy* and *Chaetophractus villosus*, the rodents *Notiomys macronyx*, *Eligmodontia elegans*, *Phyllotis darwini* and *Euneomys petersoni*, the canids *Dusicyon griseus* and *D. culpaeus*, the mustelids *Conepatus humboldtii* and *Lyncodon patagonica*. The puma *Felis concolor* is a key species in control of the population of smaller mammals, and is found in well-protected, wooded areas. Geoffroy's cat *Felis geoffroyi* (V) is also present. There are about 570 guanaco *Lama guanicoe* in the park, and the northern huemul *Hippocamelus bisulcus* (V) has disappeared from the area, but may be reintroduced. Among Amphibia are *Bufo variegatus* and *Pleurodema bufonina*, and among Reptilia *Liolaemus lineomaculatus*, *L. magellanicus*, *L. dorbignyi*, *Diplolaemus darwini* and *D. bibrioni*.

ZONING: The Management Plan distinguishes the following zones: primitive zone, extensive use zone, intensive use zone, regenerative zone, special use zone. All are available for scientific research.

DISTURBANCES OR DEFICIENCIES: Much has been damaged in clearing the land for rearing domestic stock. This is now being stopped and the lands are being restored. Two species have been introduced: *Lepus europaeus* and, to control it, *Dusicyon griseus*.

SCIENTIFIC RESEARCH: Research has already been carried out on a catalogue of the flora and fauna (including the actual distribution and situation of the species) and the preparation of an ecological map. Ecological research on the population of the guanaco *Lama guanicoe* and red fox *Dusicyon culpaeus* has been carried out, and an evaluation of the effect of the puma on the sheep remaining in the park (Toro Lake area) has been made. Research is currently being carried out on plant succession, reintroduction of *Hippocamelus bisulcus*, and population structure of the European hare and its impact on the park. Geological research and preparation of a geological map is proposed, and studies are planned on condor, eagle, Magellanic ostrich, Coscoroba swan, black-necked swan, flamingo and fish.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Abello, O. (1977). Informe Técnico de Trabajo No. 12, CONAF-XIIa, Region Magallanes. (Manuscript).

Cardenas, R. (1976). Sinopsis Ecologica del Parque Nacional 'Torres del Paine', CONAF-XIIa, Region Magallanes. (Manuscript).

CONAF (1975). Plan de Manejo Parque Nacional 'Torres del Paine'. Doc. Téc. de Trabajo, No. 19, CONAF, Chile.

Cunazza, C. (1976). CONAF-XIIa, Region Magallanes. (Stencil).

Pisano, E. (1974). Ans. Inst. Pat., 5: 59-104.

Rau, J. (1977). Doc. Téc. de Trabajo. (Manuscript).

Rau, J. (1977). CONAF-XIIa, Proyecto de Investigacion 2, Region Magallanes.

Rau, J. and Abello, O. (1977). Ans. Inst. Pat., Punta Arenas (in press).

STAFF: 1 director, 1 chief park guard, 7 park guards, 3 assistant guards, a chief and a technical assistant in environmental education, 1 ecologist and 2 other research workers, 2 landscape architects, 1 technician, 15 permanent workers, 3 drivers and several other miscellaneous employees.

BUDGET: US\$ 500,000 a year.

LOCAL PARK OR RESERVE ADMINISTRATION: Corporacion Nacional Forestal (CONAF), XII Region (Magallanes and Antarctica Chilena), Area de Ultima Esperanza, Casilla 41, Puerto Natales, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(5) Puyehue National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.10.2/8.11.2 (Valdivian forest/Chilean *Nothofagus*).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1941 (Decree 374, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: 40°40'S, 72°05'W.

ALTITUDE: 100-2,236m.

AREA: 104,017 ha.

LAND TENURE: 70% fiscal, 30% privately owned.

PHYSICAL FEATURES: Located on the Andean mountain chain in the province of Osorno, and including several inactive volcanoes and an important network of rivers. The temperature varies from 8°C to 15°C, while the average annual precipitation is around 3,000mm.

VEGETATION: Predominantly evergreen woodland of *Nothofagus*, particularly *N. pumila*, but also dominated at times by *N. dombeyi*, *N. nitida* and *N. betuloides*. *N. pumilio* is also frequently found in association with *N. antarctica*.

NOTEWORTHY FAUNA: Three mammals are typical of the southern region, *Pudu pudu*, coypu

Myocastor coypus and puma *Felis concolor*. The birds are diverse, including both residents and migratory birds. Especially noteworthy are the aquatic birds of the mountain lake region.

ZONING: The management plan is being revised to include ideas to open a large portion of the park to recreation in a natural setting. It may be feasible to combine a unique natural setting with intensive use.

DISTURBANCES OR DEFICIENCIES: There are conflicts with private landowners. The possibility of delimiting new boundaries is being studied. The inspectors are given little latitude to work with.

SCIENTIFIC RESEARCH: Most research is related to vegetation. Recently there have been some very basic fauna studies aimed at reintroducing the native species.

SPECIAL SCIENTIFIC FACILITIES: Limited to administration installations.

PRINCIPAL REFERENCE MATERIAL: Oltremari, J., Paredes, G. and Schlegel, F. (1980). Alternative delimitation of Puyehue National Park boundaries. Universidad Austral de Chile, Valdiva, Chile (including bibliography with 30 references).

STAFF: 1 administrator and 4 park guards.

BUDGET: Remuneration for personnel and building maintenance.

LOCAL PARK OR RESERVE ADMINISTRATION: Gerardo Elzo, Corporacion Nacional Forestal, X Region, Puerto Montt, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(6) Villarrica National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.37.12/8.22.5 (Southern Andean/Chilean *Araucaria*).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1940 (Decree 2236, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: Located in the provinces of Cautin and Valdiva; 39°30'S, 71°40'W.

ALTITUDE: 750-3,776m.

AREA: 65,400 ha.

LAND TENURE: Fiscal. There are 23 occupants (3 with certificates).

PHYSICAL FEATURES: The park is composed of a chain of three volcanoes, Lanin, Quetrupillan and Villarrica, the latter being active.

VEGETATION: The monkey puzzle or Chilean pine *Araucaria araucana* is found here in association with *Nothofagus obliqua* and *N. alpina*. There are also woodlands of *N. pumilo* and *N. dombeyi*, and communities of *Podocarpus nubigenus*.

NOTEWORTHY FAUNA: Most of the interesting animals are to be found in the southern part of the park. Among the mammals *Dusicyon* sp., coypu *Myocastor coypus*, southern pudu *Pudu pudu* and puma *Felis concolor* are of interest, while the avifauna is diverse (the woodland birds being of particular interest).

ZONING: Most of the park is classified as a primitive zone. There are small areas classified as extensive use zones, natural recuperation zones and intensive use zones.

DISTURBANCES OR DEFICIENCIES: Very few considering the size of the park. Some terrestrial areas have recuperated from the effects of forest fires. The presence of untitled settlers on the land creates fairly minor problems.

SCIENTIFIC RESEARCH: Quite sparse, except some general studies of park management, although the existing flora, fauna and the volcanoes offer good possibilities.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Castro, A., Tienken, A., Sebok, P. and Valdivieso, L. (1974). Guia de Manejo y Desarrollo del Parque Nacional Villarrica. Universidad Austral de Chile, Valdivia, Chile.

STAFF: 1 administrator and 2 park guards.

BUDGET: For maintenance and regulation control.

LOCAL PARK OR RESERVE ADMINISTRATION: Santiago Gomez L., Corporacion Nacional Forestal, IX Region, Temuco, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(7) Cape Horn National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.26.8 (Patagonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1945 (Decree 995, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: The islands Wollastone and L'Hermite in the department of Tierra del Fuego, at the extreme southern end of Chile; 55°45'S, 67°30'W.

ALTITUDE: From sea level to about 1000m.

AREA: 63,093 ha.

LAND TENURE: Fiscal.

VEGETATION: Dominated by thick low plants and tubers. The evergreen woodlands are confined to small valleys. Noteworthy species are *Nothofagus nitida* and *N. antarctica* which are stunted in growth form here.

NOTEWORTHY FAUNA: The habitat is especially good for marine mammals such as the otter *Lutra felina* (which inhabits coastal areas), southern sea lion *Otaria bryonia* and South American fur sea *Arctocephalus australis*. Birds are typical of the southern littoral zones, with an abundance of *Pelecanoides* sp., kelp gull *Larus dominicanis* and a great diversity of other species.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: None.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Mauricio Rosenfeld, Corporacion Nacional Forestal XII Region, Punta Arenas, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 12 June 1981.

(8) Los Paraguas-Conguillo National Park (administered as one unit)

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.22.5 (Chilean *Araucaria* Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1940 (Decree 1682, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: In the province of Cautin; 38°40'S, 71°42'W.

ALTITUDE: 800-3,124m.

AREA: 46,000 ha.

LAND TENURE: - Fiscal except for 5%.

PHYSICAL FEATURES: Situated on the Andean mountain range and including an active volcano with a double crater (which last erupted in 1957). The climate is rigorous with precipitation close to 2,000mm per year and the mean temperature 10°C.

VEGETATION: Predominantly mixed woodland of Chilean pine *Araucaria araucana* with species of *Nothofagus*, located in the transition zone. The smaller plant species are sparse, and consist principally of *Berberis* sp., *Chusquea* sp., *Ugni molinae* and *Festuca* sp.

NOTEWORTHY FAUNA: The fauna is of low diversity. Interesting mammals are *Pudu pudu*, *Felis guigna*, puma *F. concolor* and fox *Dusicyon* sp. Among birds, the presence of *Vultur gryphus*, *Campephilus magellanicus* and *Enicognathus leptorhynchus* is of note.

ZONING: There is a preliminary management plan which makes most of the park a primitive zone, and includes a natural recuperation zone, and intangible zone, an intensive use zone and an extensive use zone.

DISTURBANCES OR DEFICIENCIES: There is some disturbance from neighbouring properties, and in some sectors it is relatively extensive with the outbreak of forest fires, especially in the Los Paraguas region.

SCIENTIFIC RESEARCH: There are possibilities for significant studies of the connection between geomorphology and vegetation. Currently the reintroduction of native animals is being studied.

SPECIAL SCIENTIFIC FACILITIES: One for the study of native fauna.

PRINCIPAL REFERENCE MATERIAL: CONAF/FAO (1974). Management Plan of Conguillio-Los Paraguas National Park. National Forestry Corporation (internal document).

STAFF: 1 administrator and 4 park guards.

BUDGET: For a visitors' centre, control and administration.

LOCAL PARK OR RESERVE ADMINISTRATION: Santiago Gomez L., Corporacion Nacional Forestal, IX Region, Temuco, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(9) Juan Fernandez National Park

MANAGEMENT CATEGORY: II & IX (National Park & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 5.4.13 (Southeastern Polynesian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Decree 103, 16 January 1935, declared Juan Fernandez Archipelago as a National Park. Decree 1310, 18 August 1954, limits livestock raising and exploitation of forests; Decree 619, 15 September 1954, prohibits hunting. Accepted as a Biosphere Reserve in January 1977.

GEOGRAPHICAL LOCATION: The whole of the Archipelago consisting of Robinson Crusoe, Alexander Selkirk and Santa Clara Islands and all the islets in the area, except for 44km (the town of San Juan Bautista). 650km from the Chilean coast in the Pacific ocean; 33°41'S, 78°47'-80°47'W.

ALTITUDE: 0-1,650m.

AREA: 18,300 ha.

LAND TENURE: 97% state property, the rest private.

PHYSICAL FEATURES: The archipelago is of volcanic origin, with deep ravines and rugged mountain ranges. There are various types of lava, some 400m deep. The climate is maritime with average monthly temperatures fluctuating by less than 6°C. 75% of rain occurs during the winter.

VEGETATION: 70% of the species are endemic and there are 50 species of fern. Robinson Crusoe Island is characterized by steppe, with *Stipa fernandeziana* and *Piptochaetium bicolor*; evergreen scrub with Chilean myrtle *Ugni selkirkii* and the tree fern *Blechnum cycadifolium*; subantarctic forest with masatierra luma *Nothomyrica fernandeziana*, naranjilla *Fagara mayu*, winter's cinnamon *Drimys winteri* var. *confertifolia*, the palm *Juania australis*, michay berberry *Berberis corymbosa* and Juan Fernandez apple tree *Bohemeria excelsa* in the lower reaches, and *Cuminia fernandeziana*, *C. eriantha* and *Gunnera peltata* higher up. Alexander Selkirk Island is characterized by grasses such as *Stipa*, *Anthoxanthum* and *Nassella*, wild tobacco *Nicotiana cordifolia*, the endemic *Eryngium sarcophyllum* and rare examples of hardwoods such as *Sophora fernandezianum* and *Myrceugenia schulzei*. The rare endemics *Solanum robinsonianum*, *Denroseris litoralis* and *Denndroseris pruinata* can be found on Santa Clara.

NOTEWORTHY FAUNA: There are a few native species and some introduced. The Juan Fernandez fur seal *Arctocephalus philippi* (V) is the most important mammal. Birds include the Juan Fernandez cachudito *Anaeretes spizitornis fernandezianus*, the Juan Fernandez remoliner *Cincludes oustaleti*, the masafura rayadito *Aphrastura masafuerae*, the masafuera eaglet *Buteo polyosoma exsul*, the Juan Fernandez humming bird *Sephanoides fernandensis*, the Juan Fernandez buzzard *Falco sparverius fernandensis* and the nuco *Asio flammeus suinda*. The marine fauna is very rich and diverse, including the lobster *Vasus frontalis* (which sustains the economy of the island), the Juan Fernandez cod *Hectoria oxygeneios*, the atherine *Basilichthys fernandezianum*, the white sea-bass *Sciaenaea fasciata*, horse mackerel *Trachurus murphy* and the hake *Merluccius gayi*.

ZONING: In accordance with the management plan, the most important zone is the primitive one, followed by the intangible zone, the extensive use zone, the natural recuperation zone, the special use zone and the intensive use zone.

DISTURBANCES OR DEFICIENCIES: Livestock grazing is causing erosion. Introduced animals include the goat *Capra hircus* var. *fernandeziana*, the rat *Rattus norvegicus*, the rabbit *Oryctolagus cuniculus*, the coatimundi *Nasua narica*, the four-eyed sapito *Pleuroderma thaul* and the vineyard snail *Helix pomatia*. There has been selective felling, especially of the Chonta palm *Juania australis* and the sandalwood tree *Santalum fernandezianum*, the latter becoming extinct. Certain native species are now being replanted.

SCIENTIFIC RESEARCH: This is important to help develop management plans for maintaining the diversity of the endemic flora and fauna. So far research is scarce, and has been in relation to the importance of the resources. There is an annual fauna survey.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Gay, C. (1974). La Isla de Juan Fernandez. *Mus. Nac. Hist. Nat. Serv. Educ.* No. 9: 6-16.

Gutierrez, A., Mann, G., Merino, R., Thelen, K.D., and Dalfelt, A. (1976). Plan de manejo Parque

Nacional Juan Fernandez. Documento Técnico de Trabajo, No. 22, Proyecto FAO/RLAT tf-199. Santiago de Chile.

Johoe, G. (1896). Estudios sobre la flora de las Islas de Juan Fernandez. Santiago de Chile.

Kuschel, G. (1961). Composition and relationship of the terrestrial faunas of Easter, Juan Fernandez, Desventuradas and Galapagos Islands. Tenth Pacific Science Association, University of Hawaii, Honolulu, Hawaii, USA., pp. 79-95.

Munoz Pizarro, C. (1969). El Archipiélago Juan Fernandez y la Conservacion de sus Recursos Renovables. Mus. Nac. Hist. Nat. Ser. Educ. No. 9, pp. 17-70.

Philippi, R.A. (1956). Sobre Juan Fernandez. *Ann. Sc. Nat. Ser. 4*, Vol. III: 87.

Skottsberg, C. (1920-1953). The Natural History of Juan Fernandez and Easter Island. *Botany* Vol II, 1-960. Uppsala.

STAFF: 1 administrator, 2 rangers, 10 permanent workmen and 10 temporary workmen.

BUDGET: US\$ 20,000 for the control of rabbits, and also for personnel and control procedures.

LOCAL PARK OR RESERVE ADMINISTRATION: Ricardo Meza, Corporacion Nacional Forestal, V Region, 3 Norte 541, Vina del Mar, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 10 June 1981.

(10) Isla Guamblin National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.10.2 (Valdivian forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1967 (Decree 321, Ministry of Agriculture).

GEOGRAPHICAL LOCATION: On the western edge of the Archipelago de Los Chonos near the coastal province of Aysen; 44°50'S, 75°10'W.

ALTITUDE: 0-218m.

AREA: 10,625 ha.

LAND TENURE: Fiscal.

PHYSICAL FEATURES: A flat island on the edge of the Pacific Ocean.

VEGETATION: Dominated by evergreen species. The Chilean endemic hardwood *Tepualia stipularia*, which is found on the island, has a more stunted growth form than its conspecifics on the continent, and the inner isles.

NOTEWORTHY FAUNA: There is a low diversity of mammals, but these include two species of pinniped of importance to the fur trade, the southern sea lion *Otaria bryonia* and the South American fur seal *Arctocephalus australis*. There is an abundance of marine birds, and particularly interesting amongst these are the Magellanic diving petrel *Pelecanoides magellani*, giant fulmar *Macronectes giganteus*, Wilson's storm-petrel *Oceanites oceanicus* and kelp gull *Larus dominicanus*, but there are many others.

ZONING: None has been established.

DISTURBANCES OR DEFICIENCIES: Few of significance. Some alteration in the type of fauna has been reported, due to marine contamination from petrol tankers.

SCIENTIFIC RESEARCH: Slight, although there are prospects for research on the fauna.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: CONAF. Documentos Internos de Parques Nacionales en la XI Region. Corporacion Nacional Forestal, Coyhaique, Chile.

STAFF: No permanent staff.

BUDGET: For patrols.

LOCAL PARK OR RESERVE ADMINISTRATION: Corporacion Nacional Forestal, XI Region, Casilla 412, Coyhaique, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 12 June 1981.

(11) La Campana National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.23.6/8.11.2 (Chilean Sclerophyll/Chilean *Nothofagus*).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1967 (Law 16.699).

GEOGRAPHICAL LOCATION: Located in the province of Quillota, 40km from the city of Vina del Mar; approximately 33°S, 71°15'W.

ALTITUDE: 1,900-2,222m.

AREA: 10,000 ha approximately.

LAND TENURE: Mainly privately owned.

PHYSICAL FEATURES: Containing hills ranging from 1,900m to 2,222m in height, generally with a north exposure.

VEGETATION: Sclerophyllous woodlands in the semi-humid region of the central zone, with *Cryptocarya alba* and *Peumus boldus*. In the more humid areas is hydrophilous woodland with *Drimys winteri* and *Persea lingue*. The presence of *Jubaea chilensis* is noteworthy.

NOTEWORTHY FAUNA: Important species are red fox *Dusicyon culpaeus* and *Lagidium viscacia*. Among the birds are *Mivalgo chimago*, wild pigeon *Columba araucana* and *Sephanoides sephanoides*, but in general the diversity is poor.

ZONING: None yet established. A definitive planning scheme is scheduled for 1981.

DISTURBANCES OR DEFICIENCIES: Most of the land is privately owned, but as there is no chance for it to be used for agriculture it has remained largely unaltered.

SCIENTIFIC RESEARCH: Plants and animals have been studied, specifically in their relationship to the climate.

SPECIAL SCIENTIFIC FACILITIES: The University of Chile Geography Department has a meteorological station here.

PRINCIPAL REFERENCE MATERIAL: Ahumada, Miguel (1981). Zoning for La Campana National Park. National Forestry Corporation, V Region, Vina del Mar, Chile.

STAFF: 3 park guards.

BUDGET: Mainly for control and monitoring of disturbance.

LOCAL PARK OR RESERVE ADMINISTRATION: Ricardo Meza, Director Regional V Region, Corporacion Nacional Forestal, Vina del Mar, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

(12) Fray Jorge National Park

MANAGEMENT CATEGORY: II & IX (National Park & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.23.6 (Chilean Sclerophyll).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: On 29 March 1941 by Decree 728 all three sites were declared National Parks. Modifications were made by Decrees 318 and 326 of 1 June 1967. It was accepted as a Biosphere Reserve by the MAB Bureau in June 1977.

GEOGRAPHICAL LOCATION: The area comprises the Fray Jorge, Talinay and Punta del Viento National Parks, situated in the IVth Region, the province of Limari, and the municipality of Ovalle; 450km north of Santiago and 110km south of La Serena. The park extends along the range of mountains forming the Cordillera de la Costa; 30°34'S, 71°11'W.

ALTITUDE: 0-762m.

AREA: 9,959 ha.

LAND TENURE: State property.

PHYSICAL FEATURES: The park is situated in the mountainous Andean coastal complex which extends between the River Elqui in the north to the Aconcagua in the south. There are two kinds of topography, coastal plains and mountainous hinterland. The coastal plains have terraces of marine and pluvi-marine origin. The climate is of a modified desert type. The average monthly temperature is 14.4°C with a maximum of 18.6°C. South-westerly winds prevail except in the winter, when the wind blows from the north. As the moist sea breezes blow up over the coastal range, an almost continual cloud cover is formed over the peaks, accompanied by increased precipitation. There are no permanent rivers or creeks in the park, but a few springs exist.

VEGETATION: The park is situated in the area bordering the scrub formations and semi-desert coastal steppes on the one side, and the tree and shrub formations of the Cordillera de la Costa in the Central Region, on the other. The most important feature of this National Park is the presence of the most northerly forest in Chile. The Fray Jorge forests are green 'oases' surrounded by semi-arid lands; they have some features in common with the hygrophilous forests of the south (Valdiviano forest). The vegetation of the park (east to west) includes: a zone of semi-desert shrub formations with herbaceous species such as broom *Gutierrezia paniculata*, furze *Chuquiraga ulicina*, and shrubs such as the incense tree *Flourensia thurifera*, the puscana *Proustia pungens*, the palo negro *Cassia stipulacea* and guaiacum *Porlieria chilensis*; a zone with northern exposure containing Cactaceae, intermingled with varilla *Adesmia angustifolia* and palo negro; an inner-valley zone with a shrub association of varilla and broom; a wooded zone dominated by copses of olivillo *Aextoxicon punctatum* and arrayan macho *Rhaphithamnus spinosa*, and separated by areas of shrub and pasture vegetation such as romerollo *Lythrum hyssopifolia*, pasto salado *Distichlis spicata*, cuerno de cabra *Haplopappus foliusus*, berberry *Berberis* spp., bollén *Kageneckia oblonga* and palo blanco *fuchsia lycioides*; and a coastal zone of varilla, puscana and cardén *Puya chilensis*.

NOTEWORTHY FAUNA: The park shelters almost all the Mediterranean species typical of Chile. Among the great variety of birds are the partridge *Nothoprocta perdicaria*, turtle-dove *Zenaida auriculata*, starling *Pezites militaris*, thrush *Turdus falklandii*, goldfinch *Diuca duyca*, lark *Mimus thenca*, austral blackbird *Curaeus curaues*, and the wild pigeon *Columba araucana*. There is little variety in the mammals, the most noteworthy being the red fox *Dusicyon culpaues*, the quique *Galictis cuja* and the chingue *Conepatus chinga*. Large numbers of rodents are found, but there are few *Batrachia* or other amphibians. Introduced exotic fauna of importance include the quail *Lophortyx californica* and the hare *Lepus europaeus*. The Chilean Llama *Lama guanicoe* has become extinct in this region, and this may also be true of the chinchilla *Chinchilla lanigera*.

ZONING: None at present, but consideration is being given to the following management zones: inaccessible zone, primitive zone, zone for intensive use, zone for extensive use, zone for special use.

DISTURBANCES OR DEFICIENCIES: The reserve has remained in its natural state. There is no evidence of farming, intensive stock-raising or exploitation of the forest though there has been some introduction of livestock from adjacent land.

SCIENTIFIC RESEARCH: Priority will be given to research projects relating to management programmes for the park. Research priorities include study of the micro-climate, the vegetation, the fauna and the ecology in general; evolutionary study of the forest and its degradation; feasibility study of reintroducing species which previously existed in the region, such as the Chilean llama *Lama guanicoe* and the chinchilla *Chinchilla lanigera*; study of plant succession; study of the natural regeneration of the desert area.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Arevalo, O. (1975). Parque Nacional Fray Jorge. Coquimbo, Chile, CONAF.

CONAF (1974). Management Plan for Fray Jorge National Park. Report No. 17. Project FAO/RLAT/TF 199, Santiago, Chile.

Follmann, G. and Weisser, P. Oasis de Neblina en el Norte de Chile. Offprint, *Boletin de la U. de Chile* Vol. 67, Santiago de Chile.

Giles, P.C. (1963). Flora con valor economico de la Provincia de Coquimbo. Edition Conorte.

Munoz, P.C. and Pisano, E. (1947). Estudio de la vegetacion y flora de los Parques Nacionales Fray Jorge y Talinary. *Agriculture Técnica* VII, 2: 70-190.

Philippi, F. (1930). Una visita al bosque mas boreal de Chile. *Boletin del Museo Nacional*, 13: 96-105, Santiago de Chile.

Skottsberg, G. Apuntes de la flora y vegetacion de Fray Jorge. Coquimbo, Chile.

STAFF: An administrator, a ranger and eight workmen.

BUDGET: For administration and control.

LOCAL PARK OR RESERVE ADMINISTRATION: Guido Soto, Corporacion Nacional Forestal, IV-Region, Lincoyan 300, Los Vilos, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 10 June 1981.

(13) Rapa-Nui National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 5.4.13 (Southeastern Polynesia).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1935 by Decree 103, Ministry of Lands and Colonization.

GEOGRAPHICAL LOCATION: On Isla de Pascua (Easter Island), an island in the Pacific ocean; 29°09'S, 109°26'W.

ALTITUDE: 0-300m.

AREA: 6,800 ha.

LAND TENURE: Fiscal.

PHYSICAL FEATURES: An island located 3,600km off the Chilean coast, with enclosed freshwater lakes, volcanic craters and eroded coastlines. The climate is warm, subtropical maritime, with an average annual precipitation of 1140mm.

VEGETATION: There are 150 species of plants, 45 of which are indigenous and typical of the tropics, but despite the tropical climate the whole island is now covered mainly by grassland. *Sophora toromiro* was noteworthy, being the only species of tree or shrub known on the island in historic times. Unfortunately this species is now generally regarded as extinct in the wild (Lucas and Synge, 1978). The major cover of the dense steppe lands is by species of *Stipa* and *Nasella*, the other species being introduced.

NOTEWORTHY FAUNA: There are four species of terrestrial birds and three of marine birds, including *Fregata nubor*, the red-tailed tropicbird *Phaethon rubricauda* and the Kermadec petrel *Pterodroma neglecta*. There are no mammals except introduced rodents and carnivores. The only noteworthy reptiles are three species of marine turtles which occasionally visit the park.

ZONING: Intangible, primitive, extensive use, intensive use, service and special use zones. A large proportion of the extensive use zone (second in importance to the intangible zone) conforms to the 1976 Management Plan proposals.

DISTURBANCES OR DEFICIENCIES: Alteration by archaeological investigation, and erosion and damage caused by visitors.

SCIENTIFIC RESEARCH: Very limited, unfortunately, as the cultural resources are important and of great interest, especially archaeological. Implementation of the Management Plan is necessary, particularly inventory and mapping of the archaeological remains; moreover time is needed for restoration projects.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: CONAF (1976). Plan de Manejo del Parque Nacional Rapa Nui. Documento Técnico de Trabajo No. 20. Proyecto FAO/RLAT/TF 199. Corporacion Nacional Forestal, Santiago de Chile.

STAFF: One administrator.

BUDGET: Assigned to cover the cost of management.

LOCAL PARK OR RESERVE ADMINISTRATION: Ricardo Meza, Corporacion Nacional Forestal, V Region, Vina del Mar, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 10 June 1981.

(14) Nahuelbuta National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.22.5 (Chilean *Araucaria* Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1939 (Decree 15, Ministry of Lands and Colonization).

GEOGRAPHICAL LOCATION: Malleco province; 37°45'S, 73°W.

ALTITUDE: 950-1,570m.

AREA: 5,932 ha.

LAND TENURE: Fiscal.

PHYSICAL FEATURES: Gently undulating terrain on the high plain of the coastal hills. Climate is temperate with mean precipitation of 1200mm per year and temperatures around 13°C, the maximum temperature being in January.

VEGETATION: Dominated by *Araucaria araucana*, *Nothofagus obliqua*, *N. dombeyi*, *N. antarctica* and *N. pumilo*. In the transition woodlands it is possible to find *Laurelia philipiana*, *Weinmania trichosperma* and *Eucryphia cordifolia*, among others.

NOTEWORTHY FAUNA: Noteworthy mammals are *Pudu pudu*, red fox *Dusicyon culpaeus*, grey fox *D. griseus*, *Conepatus chinga*, puma *Felis concolor* and numerous rodents. The avifauna is diverse and approximately 50 species typical of the region have been identified.

ZONING: The management plan (1970) identifies 4 zones: one reserved for scientific study, a natural recuperation zone and recreational and transition zones.

DISTURBANCES OR DEFICIENCIES: In some sectors there is a problem of forest exploitation. It is intended to maintain these sectors for regeneration.

SCIENTIFIC RESEARCH: Practically nonexistent, although the resources are important.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Ferriere, G. (1963). Aspectos ecologicos del Parque Nacional Nahuelbuta. Medicina Veterinaria, Universidad de Chile.

Servicio Agrícola y Ganadero (1970). Plan de Manejo y Desarrollo del Parque Nacional Nahuelbuta. Div. Forestal, Santiago de Chile.

STAFF: 1 administrator and 1 park guard.

BUDGET: For park guards.

LOCAL PARK OR RESERVE ADMINISTRATION: Santiago Gomez L., Corporacion Nacional Forestal, IX Region, Temuco, Chile.

NAME OF CNPPA COORDINATOR: Juan Oltremari A.

INFORMATION DATED: 11 June 1981.

COLOMBIA

AREA: 1,138,907 sq km.

POPULATION: 28,000,000 (1980).

PARKS AND RESERVES LEGISLATION: The basic principles concerning the establishment of National Parks in Colombian law were fixed in Law 2a of 1959. Decree 2420 of 1968 created the Instituto de Desarrollo de los Recursos Naturales Renovables, now the Instituto Nacional de los Recursos Naturales Renovables y del Ambiente (INDERENA), and ascribed to it the function of declaring and administering the national parks and reserves. In 1971 a statute was promulgated on the conservation units of the National Parks system, which included the basic rules for the management, administration and development of the areas. Decree Law 2811 of 18 December 1971 defines the Colombian Code of Renewable Natural Resources and Protection of the Environment (part of which defines conservation areas and their purposes). Decree of 16 March 1977 regulates this code in relation to the areas of the national parks system.

PARKS AND RESERVES ADMINISTRATION: INDERENA receives preliminary information from the Colombian Academy of Exact Science, Physics and Biology in order to declare areas of the parks system. New areas are established by means of an agreement of the Directiva. The Penal Code recently promulgated establishes prison sentences for those who invade territory of the National Parks. National Parks are defined in Colombia as large areas with ecological integrity where plant or animal species, geomorphological complexes, historical or cultural areas with scientific, educational, aesthetic or recreational value of national importance can be retained (under an adequate management regime) for their perpetuation. Sanctuaries are areas set aside specifically to preserve species or communities of wild animals to conserve genetic resources. Colombia also has Natural Reserves, 'Unique Natural Areas' (which would appear to correspond to Natural Monuments) and Parkways (which are protected landscapes along roadways).

ADDRESS: Division de Parques Nacionales, INDERENA, Bogota, Colombia.

TOTAL AREA UNDER PROTECTION: 3,958,750 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 El Tuparro	548,000
2 Sierra de la Macarena	501,350
3 Paramillo	460,000
4 Sierra Nevada de Santa Marta	383,000
5 El Cocuy	306,000
6 Cordillera de los Picachos	286,000
7 Amacayacu	170,000
8 Nevado del Huila	158,000
9 Sumapaz	154,000
10 Farallones de Cali	150,000
11 Paramo de Las Hermosas	125,000
12 Sanquianga	89,000
13 Puracé	83,000
14 Los Katios	72,000
15 Chingaza	50,000
16 Tama	48,000
17 Pisba	45,000
18 Munchique	44,000
19 Los Nevados	38,000
20 Las Orquideas	32,000
21 Macuira	25,000

22	Isla de Salamanca	21,000
23	Corales del Rosario	18,700
24	Tayrona	15,000
25	Cueva de los Guarcharos	9,000

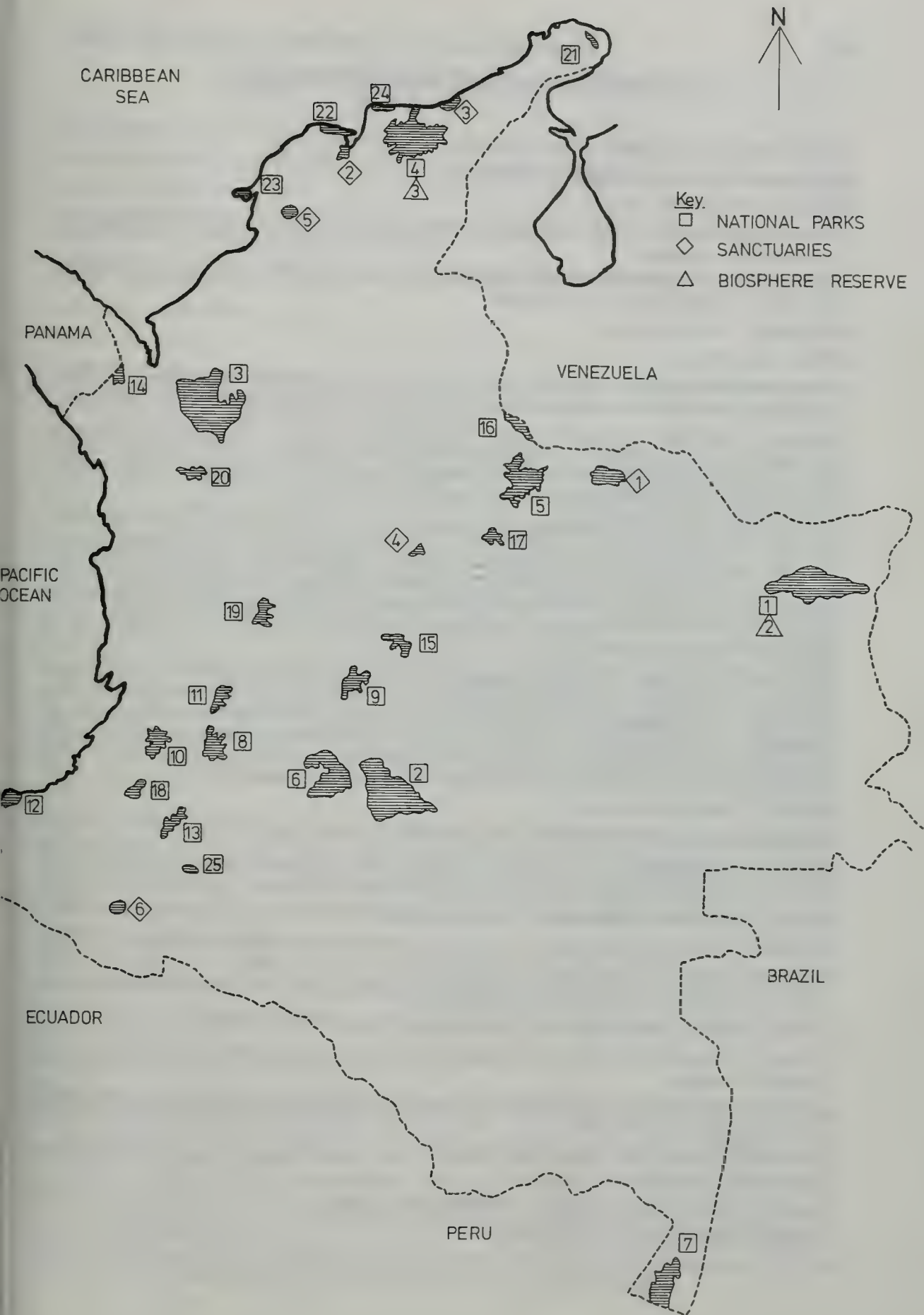
Sanctuaries

1	Arauca	90,000
2	Ciénaga Grande de Santa Marta	23,000
3	Los Flamencos	7,000
4	Iguaque	6,700
5	Los Colorados	1,000
6	La Corota*	8

Biosphere Reserves

1	Cinturon Andino Cluster	(855,000)
2	El Tuparro	(548,000)
3	Sierra Nevada de Santa Marta	(383,000)

* This area is not included in **TOTAL AREA UNDER PROTECTION**.



(1) Parque Nacional Natural El Tuparro

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.27.10 (Llanos).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Agosto 1970 como Territorio Faunístico y desde 1980 como Parque Nacional con su superficie ampliada.

GEOGRAPHICAL LOCATION: Llanos Orientales. Comisaria Especial del Vichada, Limite Oriental el rio Orinoco; 5°00'-34'N y 67°52' - 69°10'W.

ALTITUDE: 125-250 m.s.n.m.

AREA: 548,000 ha.

LAND TENURE: Pertenece a la Nacion el 99.9%. Al ampliar la superficie de la Reserva en el año 1980 y con el objeto de buscar limites arcifinios se incluyeron unos colonos que ocupan el 0.1 per cent del Parque.

PHYSICAL FEATURES: Topografia completamente plana con pequenas ondulaciones (serranias) y algunos afloramientos graniticos en su limite oriental. Algunas zonas permanecen inundadas durante parte del año. La temperatura media anual oscila alrededor de los 28°C y precipitacion promedio de 2,000 m.m. El Parque esta delimitado por los rios Orinoco - Tomo y Tuparro.

VEGETATION: El 85% de su superficie esta cubierta por sabanas con predominio de *Paspalum* spp., *Stipa* spp. y *Andropogon* sp. Algunas de estas sabanas oresentan un arbolado tipo Bosque abierto compuesto por: *Curatella americana*, *Bowdichia virgiloides*, *Byrsonima* spp. y *Caraipa llanorum*. Los Bosques en su gran mayoria riparios o de galeria encierran especialmente *Calophyllum* spp., *Couma macrocarpa*, *Jessenia polycarpa*, *Tecoma* sp., *Hymenae courbaril* y *Boursera* spp. Se destaca igualmente la presencia de los 'Morichales' formaciones homogéneas de *Mauritia flexuosa*. El pasto dominante de las sabanas es *Andropogon bicornis*.

NOTEWORTHY FAUNA: Se destaca la presencia de especies en vias de extincion como: *Pteronura brasiliensis* (V), *Crocodylus intermedius* (E), *Panthera onca* (V), *F. concolor* y *Priodontes giganteus* (V). Entre los otros mamiferos existen: *Odocoileus virginianus*, *Tapirus terrestris*, *Hydrochaerus hydrochaeris*, varias especies de primates, félidos y canidos. Entre las aves encontramos *Chauna chavarría*, Aguilas (Accipitridae), Loros (Psittacidae), Gallito de roca *Rupicola rupicola*. Dentro de los reptiles existen ademas babillas *Caiman crocodilus* (V), *Eunectes murinus* y varias especies de tortugas.

ZONING: No se han establecido.

DISTURBANCES OR DEFICIENCIES: Practicamente no existe ninguna.

SCIENTIFIC RESEARCH: Inventarios de fauna y flora. Investigacion sobre Bioecologia de: *Odocoileus virginianus*. Estudios sobre ecologia de primates especialmente *Cebus albifrons* y *C. apella*.

SPECIAL SCIENTIFIC FACILITIES: Existe un pequeno Laboratorio en el Centro Administrativo.

PRINCIPAL REFERENCE MATERIAL: Deffler, T. (1979). On the Ecology and behaviour of *Cebus albifrons* in eastern Colombia: *Primates* 20 (4): 475-402.

Deffler, T. (1980). Notes on interactions between the Tayra (*Eira barbara*) and the white-fronted capuchin (*Cebus albifrons*). *Journal of Mammalogy*.

Vincelli, Paul C. (1980). Estudio de la Vegetacion del Tuparro. INDERENA.

STAFF: 1 Zootecnista - Jefe del area, 1 Ingeniero Forestal - Auxiliar del Jefe, 14 Guardaparques y 15 Obreros y Celadores.

BUDGET: 6,900,000 pesos Colombianos en el año 1980 y 3,800,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional El Tuparro - INDERENA - Villavicencio - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(2) Parque Nacional Natural La Macarena

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Noviembre 1948 como Reserva Biologica. En el año 1971 se cambio su status a Parque Nacional Natural y se redujo la superficie.

GEOGRAPHICAL LOCATION: Orinoquia Colombiana - Departamento del Meta; 2°15' - 3°00'N, 73°00' - 74°00'W.

ALTITUDE: 200-2,500 m.s.n.m.

AREA: 501,350 ha.

LAND TENURE: La totalidad es de la Nación. Sin embargo, por la demanda por nuevas tierras laborables y el incremento de vías de acceso existen en la Macarena un gran número de colonos que están causando muy serios disturbios a esta valiosísima reserva.

PHYSICAL FEATURES: La Sierra es una cordillera aislada de 120 kilómetros de longitud y 30 kilómetros en su parte más ancha, su flanco occidental está constituido por gigantescos escarpes, el oriental presenta laderas disectadas por numerosos valles; en el eje central existen mesas con faldas casi perpendiculares. Geomorfológicamente y bioticamente puede considerarse a la Macarena como el más occidental de los tepuyes. En las partes bajas el clima es tropical húmedo con temperatura media de 25°C.

VEGETATION: Hacia el Sur de la Sierra se encuentran sabanas casmofitas y fruticetos en los cuales predominan pequeños arbolitos de follaje coriáceo (Vgr. *Brysonia* y *Roupala*). En las sabanas predominan especies de *Xyris* y plantas insectívoras (*Drosera* y *Utricularia*), pero la especie sobresaliente es un endemismo: *Vellozia macarenensis*. En las colinas y microvalles se encuentra una selva moderadamente desarrollada con abundancia de palmeras (*Mauritia flexuosa*; *Jessenia polycarpa*; *Socratea exorrhiza*), en el arbolado sobresalen especies de gran porte como *Ficus insipida* y *Sterculia macarenensis* y *S. pojeira*. En las vegas se encuentra una vegetación exuberante con presencia sobresaliente de *Ceiba pentandra*, *Tabebuia* sp., *Anacardium excelsum* y consociaciones locales de *Guadua angustifolia*. Las laderas de las montañas están cubiertas de selvas húmedas perennifolias. Hacia las partes más altas el porte del bosque se reduce y achaparra progresivamente aumentando la presencia de epífitos debido a la presencia de nieblas y aparecen elementos netamente Andinos como *Weinmannia pinnetta*. Dentro de la vegetación acuática cabe destacar la presencia de *Macarenia clavigera* que es un género endémico.

NOTEWORTHY FAUNA: La fauna presenta elementos Andino-Orinocenses, Amazonicos, endémicos, exclusivos y Guayanenses consistentes en relictos de una antigua biota de gran interés zoo-geográfico. Se destaca la presencia de varias especies incluidas en el 'Red Data Book': *Lagothrix lagotricha* (V), *Pteronura brasiliensis* (V), *Tremarctos ornatus* (V), *Priodontes giganteus* (V), *Panthera onca* (V), *Felis pardalis* (V); *Crocodylus intermedius* (E), *Caiman crocodilus* (V).

ZONING: No se han definido.

DISTURBANCES OR DEFICIENCIES: La colonización espontánea está realizando alteraciones significativas al derribar el bosque para el establecimiento de cultivos varios y para ganadería.

SCIENTIFIC RESEARCH: Se han efectuado estudios sobre biología animal, geología, taxonomía animal y vegetal, y flora.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Amador, C.R.; Idrobo, J.M.; Olivares, Antonio (1966). Parque y Reserva Biológica Nacional de la Macarena. Rev. Nal. de Agricultura No. 732.

Dahi, George (1960). Nematognathous fishes collected during the Macarena Expedition 1959. *Novedades Colombianas*: 1(5): 302-317.

Guillard, T. (1942). The Cordillera Macarena, Colombia. *Geographical Review* 23, 3: 462-470. Bibliot. Instituto Ciencias Naturales Universidad Nacional de Bogotá.

Olivares, Antonio; Mozo, M.; Teobaldo (1968). Reserva nacional de la Macarena Universidad Nal. de Colombia - INCORA, Bogotá.

Alba Silva, Fernando; Van der Hammen, Thomas (1959). Sobre la geología de la parte sur de la Macarena. No. de Minas y Petróleo, Serv. Geológico Nal. Inf., No. 132, Bogotá.

STAFF: 1 Ingeniero Jefe, 13 Guardaparques, 6 Operarios.

BUDGET: 4,100,000 pesos Colombianos 1980 y 2,487,000 primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Natural La Macarena. Oficina INDERENA - Villavicencio - Meta.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(3) Parque Nacional Natural Paramillo

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Localizado en la Cordillera Occidental, Municipios de Tierralta, y Montelibano del Departamento de Cordoba, e Ituango, Dabeiba y Peque del Departamento de Antioquia; 7°8' - 8°6'N y 75°36' - 76°30'W.

ALTITUDE: 100-3,950 m.

AREA: 460,000 ha.

LAND TENURE: La mayor parte pertenece a la Naciona, aun cuando hay en el area una minima parte en manos de colonos y otra en manos de tribus indigenas (Embera - Katios, 800 a 1,000 indigenas, cuyas actividades las realizan sin mayor perturbacion).

PHYSICAL FEATURES: El Parque incluye el Macizo de Paramillo y sectores meridionales de las Serranias de Abibe, Ayapel y San Jeronimo. En el Parque se hallan las cabeceras de los rios Sinu y San Jorge. Se trata de una area humeda o muy humeda, donde los periodos secos no son acentuados y probablemente tienen escasa incidencia.

VEGETATION: El area se halla cubierta de selvas humedas, con un sector de paramo hacia las cumbres del Macizo con especies endémicas tan características como *Aragoa occidentalis* y *Espeletia occidentalis*. En los bosques de la planicie y colinas bajas del piso térmico calido son notables el 'Caracoli' o 'Aspavé' *Anacardium excelsum*, el 'Abarco' *Cariniana pyriformis*, 'Canime' *Copaifera officinalis* y 'Dormilon' o 'Orejero' *Enterolobium cyclocarpum*. Alto grado de endemismo particularmente en el area de sectores montañosos por encima de los 1,000 metros de altura.

NOTEWORTHY FAUNA: El area pertenece al refugio pleistocénico del Sinu, definido por Haffer, como un activo centro de especiacion y a la vez nucleo de endemismos, que bajo las condiciones ecologicas de periodos recientes ha permitido el intercambio de biotas cisandinas e internadinas con biotas del Choco y de America Central, constituyendo un verdadero nucleo biogeografico. Valga citar casos de simpatria relevante como: *Tapirus bairdii* (V), *Tapirus terrestris* y *Ortalis cinereiceps*, *Ortalis garrula*. Existe un colibri endémico (*Eriocnemis vestitus pramillo*).

ZONING: No estan definidas.

DISTURBANCES OR DEFICIENCIES: Existen algunas alteraciones debido a la agricultura de antiguos colonos ubicados en la margen del rio Verde y en menor escala las producidas por tribus indigenas Ambera - Katios.

SCIENTIFIC RESEARCH: Infortunadamente no sen realizado estudios botanicos, faunisticos y ecologicos que el area demanda.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Consorcio Alto Sinu (1977). Informes.

Integral Ltda Ingenieros Consultores (1963). Estudio Fisico de la Hoya del Rio Sinu.

STAFF: No hay en la actualidad personal destacado en el area.

BUDGET: No se cuenta con fondos para el efecto.

LOCAL PARK OR RESERVE ADMINISTRATION: No existe, su pueden dirigir a INDERENA, Division de Parques nacionales - Bogota - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(4) Parque Nacional Natural Sierra Nevada de Santa Marta

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964 inicialmente y en 1977 ampliada la superficie.

GEOGRAPHICAL LOCATION: Costa norte de Colombia, en jurisdiccion de los Departamentos del Magdalena, Guajira y César; 10°43' - 11°16'N y 73°10' - 74°00'W.

ALTITUDE: - 0 a 5,800 m.

AREA: 383,000 ha.

LAND TENURE: De la Nacion en su gran mayoria y de comunidades indigenas. Un porcentaje muy pequeno 4% en poder de colonos ubicados por debajo de los 500 metros.

PHYSICAL FEATURES: Cubre todos los pisos térmicos de Colombia, con relieve muy quebrado y fuertes pendientes. El area encierra los nacimientos de importantes rios como el Cesar, Don Diego, Palomino, Aracataca y Tucurinca. La maxima elevacion corresponde al pico Simon Bolivar (mayor altura de Colombia). La Sierra es la unica montana intertropical con nieve perpetua, que se levanta desde el borde del mar. Con un gran valor arqueologico (Recientemente se descubrio las mas grandes ruinas, testigos de asentamientos de tribus Kogui, Arjuacos y Tayrona, llamada la Ciudad Perdida). Incluye efectos de glaciacion, circulos glaciales y morrenas terminales y rocas pulimentadas. Los picos nevados denominados por los Indigenas Chundua, son considerados lugares sagrados.

VEGETATION: Representa una cliserie que se extiende desde la subhygrophytia somegatérmico hasta el piso nivel pasando por conjunto de bosques nublados y paramo propiamente. Elementos sobresalientes de la flora son: Trupillo *Prosopis juliflora*, Guayacan *Bulnesia arborea*, Resbalamono *Bursera simaruba*, Ebano *Caesalpinia ebano*, Yopo *Albizia colombiana*, Saman *Samanea saman*, Orejero *Enterolobium cyclocarpum*. En el paramo son caracteristicos las especies de Frailejon *Espeletia glossophyllum* y *E. subnerifolia*, arborescentes ramificados hasta de 4-5 metros, que al igual que otros elementos bioticos relevan pronunciada afinidad con la Sierra de Mérida.

NOTEWORTHY FAUNA: Muchas especies endémicas, entre otras una Rana *Geobatrachus walkeri* y Sapo *Atelopus carrikeri* y el Venado *Mazama americana carrikeri*. Hay una buena poblacion de Condores *Vultur gryphus* y aves como: Soledades *Pharomachrus* sp., Aguilas reales *Harpia harpya* (R), *Cinclodes fuscus oreobates*, *Turdus fuscatercacozelus*, *Campylopterus phainolephus* etc. En mamiferos sobresalen Pumas *Felis concolor*, Tigres *Panthera onca* (V), Oso Hormiguero *Myrmecophaga tridactyla* (V) y el caracteristico Raton *Thomasomys laniger*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Existen predios de colonos que realizan actividades de agricultura y ganaderia, en terrenos que llgan hasta los 600 metros de altura. Actualmente se esta ejerciendo control para evitar ampliacion de estas actividades. Recientemente se constituyo una reserva indigena que cubre casi toda la superficie del Parque como medida para proteger la escaza poblacion indigena establecida alli hace muchos anos y evitar entrada al area de colonos. La actividad desarrollada

por los indigenas no causa mayores problemas.

SCIENTIFIC RESEARCH: Se han efectuado varias exploraciones científicas para estudios especialmente sobre aves, flora y arqueología. Actualmente el Instituto Colombiano de Antropología esta adelantando estudios en las ruinas recientemente descubiertas.

SPECIAL SCIENTIFIC FACILITIES: No desarrollados en el area. Sin embargo existen posibilidades de alojamiento en las cabanas de vigilancia.

PRINCIPAL REFERENCE MATERIAL: Herrman, Reimen. Las Causas de la Sequia Climatica en la Region Costanera de Santa Marta - Colombia. En revista de la Academia Colombiana de Ciencias Exactas, Fisicas y Naturales.

Grimwood, Ian (1968). Reports and Recommendations on the Sierra Nevada de Santa Marta National Park, the Isla Salamanca National Park, the Tayrona National Park and the Macarena National Reserve.

Mertins, Gunter. Anotaciones sobre un Programa para la Proteccion del Paisaje en la vertiente noroeste de la Sierra Nevada de Santa Marta. Mitt. Inst. Colombo Aleman. Santa Marta.

Morello, Jorge (1976). Primer borrador de ideas para el Proyecto de Ecodesarrollo del Macizo de Santa Marta, CIFCA-INDERENA. Bogota.

STAFF: 1 Ingeniero Agronomo, Jefe del Proyecto, 5 Guardaparques (Indigenas Arhuacos), 3 Operarios (Indigenas Arhuacos).

BUDGET: 2,900,000 pesos Colombianos en 1980 y 1,872,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Sierra Nevada de Santa Marta - INDERENA - Santa Marta - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(5) Parque Nacional El Cocuy

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Localizado en el eje actual de la Cordillera Oriental, Municipios de Chita, Cubara, El Cocuy, Guican, La Salina, Tama y Tamara, Departamentos de Boyaca, Intendencia de Arauca y Casanare; 6°11'-56'N y 72°12'-27'W.

ALTITUDE: 500-5,400 m.

AREA: 306,000 ha.

LAND TENURE: De la Nacion un 97 per cent. Solo un 3 per cent en su flanco oriental se halla en manos de colonos.

PHYSICAL FEATURES: Alli se situa un conjunto de nevados permanentes muy proximos entre si y que hacen parte de la Divisoria Andina Continental. El Parque representa una transeccion del eje Andino Oriental, que cubre las cimas mas altas y estribaciones desde su misma base (Orinoquia) ca. 500 m. en el piedemonte de la Cordillera Oriental. Procesos de glaciario son muy evidentes. Existen lagos de origen glaciar y nacen alli varios rios tributarios del Arauca y Casanare. Su flanco oriental incluye terrazas altas cubiertas de selva representativas de la planicie del piedemonte llanero y orinocense.

VEGETATION: Solo se han hecho reconocimientos por encima de 2,500 m.s.n.m. Esquemáticamente se tiene que aproximadamente a los 500 m hay sabana natural con *Curatella americana* y selva de piedemonte, con pronunciadas afinidades florísticas amazónicas, integradas con selvas nubladas en las laderas, que tienen extremada diversidad de especies, hasta el limite inferior del paramo. En alturas de

unos 2,500 metros hacia arriba el bosque corresponde a la conclimax del *Weinmannion*. El paramo presenta predominio de gramíneas (*Calamagrostis*, *Festuca*, *Stipa*, *Sporobolus*, etc.) con varias especies de frailejones (*Espeletia colombiana*, *E. lopezii*, *E. jimenez-quezada*), bosquetes de paramo *Polylepis*, *Valeriana*, *Senecio* etc.

NOTEWORTHY FAUNA: Condores *Vultur gryphus*, Torcazas *Zenaida auriculata*, *Muscisaxicola alpina quesadae*, *Grallaria quitensis alticola*, Triguillos *Felis wiedii* (V), Cusumbos *Nasua nasua* y Oso de Anteojos *Tremarctos ornatus* (V).

ZONING: No se han delimitado.

DISTURBANCES OR DEFICIENCIES: Existen predios de particulares que realizan algunas actividades de ganadería y agricultura especialmente en el flanco occidental de la reserva 3 per cent del total.

SCIENTIFIC RESEARCH: Existen varias investigaciones especialmente sobre geología, glaciología, etnología, ecología vegetal e inventarios cualitativos de flora y fauna.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Cleef, Antoine M. (1977). Secuencia Altitudinal de la Vegetación de los Paramos de la Cordillera Oriental.

Cleef, Antoine M. (1977). Sinopsis de las Comunidades Vegetales de los Paramos de la Cordillera Oriental.

Hernando, Romero (1973). Revista de la Academia Colombiana de Ciencias. Vol XIV, Aves de la Sierra Nevada del Cocuy.

Kraus, Erwin y van der Hammen, Thomas (1960). Las Expediciones de Glaciología de A.G.I. a las Sierras de Santa Marta y del Cocuy. I.G.A.C.

STAFF: 1 Jefe del área, Ingeniero Forestal, 4 guardaparques, y 2 operarios.

BUDGET: 2,100,000 pesos Colombianos - 1980 y 1,088,600 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque Nacional Natural El Cocuy - INDERENA - Tunja - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(6) Parque Nacional Natural Cordillera de Los Picachos

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane)

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Ubicado parte en el eje de la Cordillera Oriental y parte en el ramal denominado Cordillera de los Picachos, en los Departamentos del Meta y Huila e Intendencia de Caqueta, municipios de San Juan de Arama, Algeciras, Guacamayas y San Vicente del Caguan; 2°27' - 3°05'N y 74°15' - 54'W.

ALTITUDE: 250 a 3,600 m.

AREA: 286,000 ha.

LAND TENURE: Terrenos de propiedad de la Nación, pero existen algunos problemas con colonos en vía de solución debido principalmente a la inadecuada cartografía, disponible hasta la fecha reciente. Se requiere una redelimitación del área, pues por lo dicho se incluyeron áreas colonizadas y dejaron de incluirse áreas vírgenes.

PHYSICAL FEATURES: La Sierra forma el divorcium aquarum entre la Orinoquia y la Amazonia. Topografia muy rugosa con zonas bajas de colina. Es un pequeno ramal de la Cordillera Oriental que se extiende desde el Cerro Triunfo en el sentido SE/NW y alcanza elevaciones superiores a 3,000 metros.

VEGETATION: La cobertura vegetal consta de selvas humedas, con presencia de frailejonales *Espeletium* en las partes altas. Entre los 300 y 600 metros se encuentran especies tales como: *Abarco Cariniana priformis*, *Ceiba pentandra*, *Anacardium excelsum* y *Cedrela* sp.

NOTEWORTHY FAUNA: La region esta practicamente inexplorada, sin embargo, se sabe de la presencia de especies tales como Danta *Tapirus terrestris* y *T. pinchaque*, y se han visto Condores *Vultur gryphus* y *Lagothrix lagothricha lugens* (V).

ZONING: No se han definido.

DISTURBANCES OR DEFICIENCIES: Debido a la no claridad de los linderos como consecuencias de cartografia deficiente existe en el area actividad agricola y ganadera, con asentamientos de colonos que hacen extraccion de madera. Una redelimitacion del area traera como consecuencia sin reducir la superficie extraer areas alteradas significativamente e incluir otras hacia la vertiente de la Orinoquia que se hallan en estado virgen.

SCIENTIFIC RESEARCH: Muy poco explorada el area.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: No se conoce.

STAFF: No hay actualmente.

BUDGET: Aun no designado.

LOCAL PARK OR RESERVE ADMINISTRATION: Director Regional INDERENA - Neiva - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(7) Parque Nacional Natural Amacayacu

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1975.

GEOGRAPHICAL LOCATION: En el extremo sur de la Amazonia Colombiana, Municipio de Leticia, Comisaria del Amazonas. Delimitado por el Rio Amacayacu, Quebrada Cahuinas, Rio Cotuhe, quebradas Muneca, Matamata y Rio Amazonas; 3°02'-47'S y 69°59' - 70°25'W.

ALTITUDE: Promedio 100 m.

AREA: 170,000 ha.

LAND TENURE: De la Nacion un 99.98 per cent y 0.2 per cent en posesion de colonos e indigenas Ticunas.

PHYSICAL FEATURES: Planicie aluvial terciaria, disectada formando relieve ondulado suave con colinas bajas, temperatura media anual de 24°C y la precipitacion excede un poco de los 3,000 mm. Con excepcion de una elevacion que constituye la divisoria de aguas de las cuencas Putumayo y Amazonas, las alturas no pasan de 100 metros s.n.m., presentandose zonas pantanosas distribuidas en depresiones de poca extension.

VEGETATION: El bosque climax del area pertenece a la higrofitica Isomegatermico. En las

depresiones aparece una *Oxyhygrophytia* caracterizada por volador o munguba *Pseudobombax munguba* o de buruti, canangucha *Mauritia* sp. que cuando el nivel de agua del rio Amazonas sube al maximo da paso a comunidades hidrofitas tales como *Eichornia pistia* y *Victoria amazonica*. En los sectores temporalmente inundables son caracteristicos el capinuri *Ogodeia* sp., *Calycophyllum spruceanum* y *Ficus insipida*. En la selva no inundable que presenta dosel elevado con arboles hasta de 40 metros, emergen la Ceiba *Ceiba pentandra*, *Terminalia amazonica*, *Cedrelinga catenaeformis*, *Caraoa guianensis* etc. Es importante la presencia dentro del area de la especie mas fina de caucho *Hevea quianensis* var. *lutea*.

NOTEWORTHY FAUNA: No existen en el area estudios o levantamientos faunisticos, pero sobresalen en ella Tigre *Panthera onca* (V), Tigrillos *Felis wiedii* (V), manati *Trichechus manatus* (V), Nutria *Lutra* sp., varias especies de primates, *Lagothrix lagothricha* (V), el Paujil *Crax alector*, Loros, Pericos, Pavas y Tucanes. En reptiles se destacan la Anaconda *Eunectes murinus* gigas y el Caiman Negro *Melanosuchus niger* (E).

ZONING: No estan definidas.

DISTURBANCES OR DEFICIENCIES: Hay alteracion en una pequenissima area del parque, especialmente en las riberas del Rio Amazonas y cerca a la desembocadura del Rio Amacayacu. Existen en el area 2 caserios indigenas con 40 casas y 280 personas dedicadas al cultivo de yuca, platano, maiz y pina, pero que en realidad es muy poco el dano que estan causando al Parque.

SCIENTIFIC RESEARCH: Solo se han efectuado en el area algunos inventarios parciales de fauna y flora.

SPECIAL SCIENTIFIC FACILITIES: No desarrollados.

PRINCIPAL REFERENCE MATERIAL: IGAC (1977). Algunos aspectos de la degradacion de los suelos y la colonizacion en el area 'Amazonica'. Bogota.

IGAC (1977). Informes varios, Proyecto Radargramétrico del Amazonas. Bogota.

STAFF: 1 Ingeniero Forestal, Jefe del area, 5 guardaparques y 4 obreros.

BUDGET: 3,000,000 de pesos Colombianos en 1980 y 1,775,000 pesos Colombianos primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Amacayacu, INDERENA, Leticia - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(8) Parque Nacional Natural Nevado del Huila

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Junio 1977.

GEOGRAPHICAL LOCATION: Cordillera Central, Departamentos del Tolima, Huila y Cauca; 2°47' - 3°29'N y 75°48' - 76°12'W.

ALTITUDE: 2,600 a 5,750 m.s.n.m.

AREA: 158,000 ha.

LAND TENURE: Un 90% de la Nacion el resto en manos de colonos.

PHYSICAL FEATURES: El Parque incluye el Nevado del Huila, volcan con una elevacion de 5,750 metros que muestra cierta actividad. La reserva comprende pisos térmicos templados, frio y de paramo.

VEGETATION: Las laderas estan cubiertas por un bosque higrofitico frecuentemente nublado micromisofito, dominado en amplios sectores por consociaciones de *Quercus humboldtii*, asociaciones con predominio de *Weinmannia* spp., *Podocarpus* spp., cuyo dosel llega hasta los 30 o 40 metros de altura. Se encuentran también Palmas de Cera *Ceroxylon* spp., correlativamente de manera inversa con la altura disminuye el porte del bosque para bosques densos v. gr. *Clethra ferruginea* y especies asociadas alcanzan elevaciones de 3,600-3,800 metros. En el paramo parece ser dominante *Espeletia hartwegiana*, cuyas caulirosulas alcanzan 5-8 metros de altura. Por encima del paramo existe una faja de arenales subnavales con algunas pocas especies arbustivas y herbaceas. La flora del Parque es aun muy poco conocida, sin embargo, en anos recientes se ha descrito de allí un considerable numero de especies nuevas.

NOTEWORTHY FAUNA: La zona del Parque es especialmente rica en aves, sobresalen el Condor *Vultur gryphus*, el Aguila Real *Accipiter collaris*, Danta de Paramo *Tapirus pinchaque* (V), Oso Negro *Tremarctos ornatus* (V), Venado de Paramo *Odocoileus virginianus goudoti* y varias especies de primates.

ZONING: No se han determinado.

DISTURBANCES OR DEFICIENCIES: Existen predios de particulares que realizan algunas actividades agropecuarias incompatibles con el Parque, asi como también una alta presion sobre el bosque a la altura de los 2,600 metros.

SCIENTIFIC RESEARCH: Solo se han efectuado exploraciones y no existen estudios que puedan ser mencionados.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: No se conoce.

STAFF: 1 Ingeniero Forestal, Jefe del area, 3 Guardabosques, 1 Obrero.

BUDGET: 1,400,000 pesos Colombianos en 1980 y 1,097,000 pesos Colombianos primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque Nacional Nevado del Huila -INDERENA - Neiva.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(9) Parque Nacional Natural Sumapaz

MANAGEMENT CATEGORY: II (National Park)

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Ubicado en la Cordillera Oriental, Jurisdiccion del Distrito Especial de Bogota, Municipios de Cabrera, San Bernardo, Arbelaez, Gutierrez, Pasca, Departamento de Cundinamarca; Acacias, Guamal y San Luis de Cubaral, Departamento del Meta y Colombia, del Departamento del Huila; 3°45' - 4°10'N y 74°10'-30'W.

ALTITUDE: 1,500-4,600 m.

AREA: 154,000 ha.

LAND TENURE: La mayoría de los terrenos son baldios, lo que equivale decir que pertenecen a la Nacion. Existen areas cultivadas con papa y otras dedicadas a ganaderia.

PHYSICAL FEATURES: Se trata de un macizo montanoso situado en el eje de la Cordillera Oriental, cuya maxima elevacion se situa en el Cerro Nevado (4,600 m), llamado asi por mostrar la mayor parte del ano un casquete de nieve. Los grandes escarpes sobresalientes constituyen nudos hidrograficos donde nacen rios como el Cabrera, Sumapaz y Guape. Se presenten morrenas asociadas generalmente con flujos

de lodo y depositos fluvio glaciales, circos glaciales con escarpes pronunciados que encierran lagunas y valles en forma de ‘U’. Se encuentran ademas grandes declives en laderas orientales que pertenecen a la Orinoquia y en las occidentales que pertenecen a la Hoya de Magdalena.

VEGETATION: Las estrivaciones del Macizo estan cubiertas de selvas nubladas con gran riqueza floristica. Entre los 3,200 y 3,600 m el bosque es reemplazado por vegetacion de paramo con predominio de *Calamagrostis* spp., *Festuca* spp., *Eragrostis* spp. etc., entremezcladas con subarbustos y otras herbaceas, con frailejones *Espeletia* spp. y en algunos sitios con *Azorella* spp., *Distichia tolimensis*, *Wermeria* spp. etc. En lugares protegidos aparecen bosques nanomicrofitos con *Polylepis cocuyensis* y *Senecio vaccinioides*. En alturas de mas de 4,000 metros de altura sobre arenales y suelos esqueléticos hay especies como *Senecio niveo-aureus*, *Senecio rufescens* etc.

NOTEWORTHY FAUNA: Aparentemente subsisten Condores *Vultur gryphus*, ya que hay registros de que alli anidaban, Danta de Paramo *Tapirus pinchaque* (V), Oso de Anteojos *Tremarctos ornatus* (V), Ave Chirriador endémico de alli *Cistothorus apollinari* y otras aves como *Oxyura jamaicensis*, *Gallinago stricklandii*, *Grallaria quitensis alticola* y *Cinclodes fuscus oreobates*. Existen alli hasta 3,800 a 4,000 metros Camaleon *Phenacosaurus paramorun*, Lagartijas *Stenocercus trachycephalus* y una rana *Hyla labialis krausi*.

ZONING: No existen en la actualidad.

DISTURBANCES OR DEFICIENCIES: Existen predios de particulares que realizan actividades de agricultura y ganaderia, incompatibles con los abjetivos de la reserva y pajonales en los paramos que han sido abjeto de quemas, el area alterada puede equivaler aproximadamente a un 20 per cent del total.

SCIENTIFIC RESEARCH: Hay varios reconocimientos geologicos, floristicos, faunisticos y arqueologicos.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Hettner, Alfred (1892). La Cordillera de Bogota.

INGEOMINAS (1962). Boletin Geologico Vol. X.

STAFF: Solo a partir de 2o. semestre de 1981, comenzara a hacer reconocimientos 1 Ingeniero Forestal, quien tiene responsibilidad comartida por dirigir la planificacion del manejo de esta area con la direccion de otra (Parque Nacional Natural Chingaza).

BUDGET: No existe.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Proyecto Parques Nacionales Chingaza - Sumapaz, INDERENA, Regional Cundinamarca, Bogota, Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(10) Parque Nacional Natural Los Farallones de Cali

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1968.

GEOGRAPHICAL LOCATION: En el eje de la Cordillera Occidental, Municipios de Jamundi, Cali, Dagua y Buenaventura, Departamento del Valle; 02°57' - 3°25'N y 76°34' - 77°02'W.

ALTITUDE: 400-3,800 m.

AREA: 150,000 ha.

LAND TENURE: Aproximadamente 90 per cent de la Nacion y 10 per cent en posesion de colonos.

PHYSICAL FEATURES: El nucleo del Parque lo constituyen los llamados Farallones de Cali, conjunto de grandes elevaciones aisladas dentro de la Cordillera occidental que alcanzan su mayor altura sobre la divorcia entre las laderas (occidentales) del Pacifico y la Cuenca del Rio Cauca en la ladera occidental nacen varios rios de importancia como el Anchicaya y el Naya, dentro de los cuales y fuera del Parque se han establecido 2 hidroelectricas, Alpie de la ladera oriental se situa la ciudad de Cali estimada en 1,500,000 habitantes.

VEGETATION: El area en mas de 70 per cent esta cubierta de selvas que se extienden desde el piedemonte del Litoral Pacifico con precipitaciones de 8,000 m, con endemismos como los de varias especies de *Cecropia*. Este complejo se integra con selvas nubladas insuficientemente exploradas que incluyen entre otras comunidades el *Quercetum*, y que a los 3,200-3,300 metros son reemplazados por un tipo de vegetacion analoga floristicamente y fisionomicamente a las comunidades de Paramo pero con ausencia de *Espeletia* spp. y alto grado de endemismos como *Viola cuatrecasii*. Entre las *Cecropias* es de destacar la *Cecropia megastachya*, cuyas hojas tienen un diametro de 2 metros aproximadamente, siendo quizas el arbol de mayor superficie foliar conocido. Endemismos sobresalientes figuran dentro de los bosques nublados de la ladera.

NOTEWORTHY FAUNA: La diversidad faunistica del Parque es extremada, dada la varoedad macroclimatica y la representacion de elementos de origen altoandino y de elementos 'subtropicales' de probable origen plio-pleistocénico a partir de elementos de la biota humeda del Litoral Pacifico y de otros con difusion principalmente del piso térmico del Valle interandino. Aun no se han realizado suficientes exploraciones, sin embargo, dentro de los elementos sobresalientes figuran *Tremarctos ornatus* (V), *Oryzomys munchiquensis*, Gallito de Roca *Rupicola peruviana sanguinolenta*, Golondrinas *Nothiochelidun flavipes*.

ZONING: No se han definido.

DISTURBANCES OR DEFICIENCIES: Existen predios de particulares que realizan actividades de agricultura y ganaderia, y actualmente con el control, ésta actividad se esta restringiendo.

SCIENTIFIC RESEARCH: Existen inventarios cualitativos de flora y fauna especialmente en el flanco oriental.

SPECIAL SCIENTIFIC FACILITIES: Aun no desarrollados.

PRINCIPAL REFERENCE MATERIAL: Varios informes inéditos de Universidad del Valle y Corporacion Autonoma Regional del Valle del Cauca, sobre flora y fauna.

STAFF: 1 Biologo, 1 Interprete, 4 guardabosques de la Corporacion Autonoma Regional del Valle del Cauca.

BUDGET: Existe pero no se conoce el dato exacto a la fecha.

LOCAL PARK OR RESERVE ADMINISTRATION: Corporacion Autonoma Regional del Valle del Cauca C.V.C. - Cali - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(11) Parque Nacional Natural Las Hermosas

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Localizado en la Cordillera Central laderas E y W, Municipios de Palmira, Tulua, Buga, Cerritos y Pradera, Departmaneto del Valle y Chaparral y Rio Blanco Departamento del Tolima; 03°29'-55'N y 75°41' - 76°04'W.

ALTITUDE: 2,500-4,000 m.

AREA: 125,000 ha.

LAND TENURE: 90 per cent propiedad de la Nacion y un 10 per cent en manos de colonos y propiedad privada.

PHYSICAL FEATURES: En el area existen tres formaciones geograficas: rocas intrusivas, metamorficas y formaciones modernas procedentes del neovolcanismo. Su topografia es escarpada con un gran numero de lagunas en pequenos valles. Alli se originan rios importantes como el Anamichu, Rioblanco, Amoya, Tulua, Ambeima, fuentes principales para hidroelectricas, riego y consumo humano de varias poblaciones.

VEGETATION: Existen dos tipos de vegetacion bien definida el bosque extendido en forma irregular sobre todo en las partes mas bajas del Parque entre 2,500-3,000 metros, y en las partes protegidas de las corrientes de aire y a los lados de las corrientes de agua, y donde sobresalen especies como Pino colombiano *Podocarpus rospigliosii*, Palma de Cera, arbol Nacional de Colombia y en via de extincion *Ceroxylon quinduense*, *Weinmannia* y el tipo Paramo con *Espeletia* sp. *Dryopteris felix-max* un helecho macho enano, chilco *Bacharis floribunda* y musgos del género *Sphagnum*.

NOTEWORTHY FAUNA: Dentro de los mamiferos las especies mas notorias son: Danta de Paramo *Tapirus pinchaque* (V) con una muy buena poblacion, en via de extincion, oso de Anteojos *Tremarctos ornatus* (V) también en peligro de extincion, el venado *Mazama rufina*, Guagua Loba *Dinomys branickii*. En aves: Pato de Torrentes *Merganetta armata* y Pato Rabudo *Anas acuta*, *Gallinago nobilis* y *Amazona mercenaria*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Quemas, extracciones esporadicas de madera efectuadas por los propietarios y colonos que aun viven en el area.

SCIENTIFIC RESEARCH: Se han efectuado inventarios de fauna y flora, por parte de la Universidad del Valle y un Voluntario del Cuerpo de Paz. Se proyecta un estudio detallado de la Danta (*Tapirus pinchaque*).

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Downer, Craig (1978). Informe sobre la visita al Parque Nacional Natural Las Hermosas. C.V.C. Cali.

Mosquera, Jose Maria (1979). Importancia del Parque Nacional de las Hermosas en la Agricultura del Tolima. Ibagué, en Carta del Tolima No. 27-28, Julio y Agosto 1979.

STAFF: No hay destacado en el area, con frecuencia guardabosques de areas vecinas realizan inspecciones de control.

BUDGET: Aun no designado.

LOCAL PARK OR RESERVE ADMINISTRATION: Corporacion Autonoma Regional del Valle C.V.C., Cali Colombia y Direccion Regional Tolima, INDERENA, Ibagué, Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(12) Parque Nacional Natural Sanquianga

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Litoral pacifico, Municipio de Mosquera, Departamento de Narino; 2°22'-43'N y 78°06'-37'W.

ALTITUDE: Desde 0 metros hasta 100 metros.

AREA: 89,000 ha.

LAND TENURE: Baldios pertenecientes a la Nacion, pero con presencia de colonos dedicados al aserrio de madera (10% del area).

PHYSICAL FEATURES: El Parque incluye la Isla de Sanquianga y la desembocadura del rio del mismo nombre., La region pertenece algeosinclinal de Bolivar. Los terrenos son planos de origen aluvial, en gran parte pantanosos e influenciados por las mareas que alcanzan hasta 5 metros. También existen colinas bajas con superficies de colmatacion. Entre el nivel maximo de baja mar y maximo de pleamar e encuentra la formacion de 'esteros'. Clima isomegatérmico con precipitacion anual alrededor de 4,000,m.m.

VEGETATION: Se puede establecer una zonacion bastante definida: a) Playas arenosas del litoral bajo con herbaceas; b) Manglares con *Rhizophora* spp., *Avicennia germinans*, *Laguncularia racemosa* y *Pelliciera rhizophorae*. c) Natal ecotonal sin influencia salina con *Mora oleifera*, *Mora megistosperma*, asociado con 'Naidi' *Euterpe* spp., que invade orillas de rios como subserial; d) Guandal con *Carapa guianensis*, bosque extraido y e) Terrazas con una asociacion mixta donde predomina *Virola* spp. y *Cannosperma* sp.

NOTEWORTHY FAUNA: Poco estudiada en el area. Sobresalen aves acuaticas incluidas migratorias. Area de enorme productividad piscicola, se destaca la 'Piangua' *Arca* spp.. Se presentan comunidades de Chiguiros *Hydrochaerus hydrochaeris* y Zainos *Dycotyles tajacu*.

ZONING: No definida.

DISTURBANCES OR DEFICIENCIES: Existen algunos aserradores en el area que ocupan aproximadamente un 10 per cent de la misma, y que estan causando serias alteraciones al extraer especies madereras valiosas. Estos aserrios estaban establecidos al crearse el Parque y actualmente se estan efectuando controles para lograr su erradicacion del Parque. Existen posibilidades de ampliar la superficie del Parque incluyendo una gran area en estado virgen.

SCIENTIFIC RESEARCH: Existen reconocimientos de vegetacion y en la actualidad se esta desarrollando un estudio ecologico.

SPECIAL SCIENTIFIC FACILITIES: Aun no se han desarrollado.

PRINCIPAL REFERENCE MATERIAL: Banco, Ganderó (1967). Estudio Socioeconomico de la Costa Sur del Pacifico.

Woketel, Roberto (1961). Mapa geologico del Occidente de Colombia.

Estudios varios sobre potencial maderero de la zona del sur del Pacifico Colombiano.

STAFF: 1 Ingeniero Forestal Jefe del Proyecto, 2 guardaparques.

BUDGET: 2,000,000 de pesos Colombianos 1980 y 2,100,000 pesos Colombianos 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque nacional Sanquianga - INDERENA - Tumaco - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(13) Parque Nacional Natural Puracé

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1961 ratificado en 1968. Ampliada su superficie 1977.

GEOGRAPHICAL LOCATION: Cordillera Central. Macizo Colombiano o estrella fluvial de

Colombia. Municipios La Plata, Argentina, San Agustín, San José de Isnos del Departamento del Huila; Puracé y San Sebastián, Departamento del Cauca; 1°50'-2°24'N y 76°07'-37'W.

ALTITUDE: 2,500-5,000 m.

AREA: 83,000 ha.

LAND TENURE: En su gran mayoría de la nación. Aproximadamente unas 3,000 hectáreas de propiedad privada ocupada por colonos.

PHYSICAL FEATURES: Cordillera volcánica de Puracé, con un volcán activo 7 cráteres más, afloramientos de aguas termales. Nacimientos de los ríos Magdalena, Cauca y Caqueta (tres de los más importantes de Colombia). En el Parque hay unas treinta lagunas y un buen número de cascadas. El clima se caracteriza por un régimen monomodal en la vertiente este, y bimodal en la occidental. La temperatura oscila entre 10°C y 0°C y la precipitación de 1,200 a 2,500 mm por año.

VEGETATION: Encierra varias formaciones vegetales especialmente páramo y bosque muy húmedo montano bajo. Entre las especies arbóreas son características: Encenillo *Weinmannia pubescens*, Roble *Quercus humboldti*, Sietecuecos *Tibouchina lepidota*, Arrayán *Myrcia popayanensis*, Canelo de páramo *Drymis granadensis* y uvito de monte *Cavendishia pubescens*. En el páramo sobresalen: *Espeletia hartwegiana*, *Distichia tolimensis*, *Lupinus alopecuroides*, *Calamagrostis* sp. Hay tuberías y trementales de *Sphagnum* sp. En las depresiones y lugares protegidos de las partes altas entre 3,400-3,800 metros se encuentra *Escallonia* sp., *Hypericum* sp. y *Puya* sp.

NOTEWORTHY FAUNA: El Parque tiene singular importancia por su fauna endémica y por la protección de especies en peligro de extinción como son: Oso de anteojos *Tremarctos ornatus* (V) con una muy buena población, tal vez la más grande del País, el venado conejo *Pudu mephistophiles* (I), Danta de páramo *Tapirus pinchaque* (V). Otros mamíferos presentes son: Puma *Felis concolor*, Cusumbos *Nasua nasua* y Tigrillo *Felis yagouaroundi* (I). Entre las aves destacan el Condor de los Andes *Vultur gryphus*, Gallito de roca *Rupicola peruviana*, Pato de los torrentes *Merganetta armata colombiana*, Águila *Oroaetus isidori*, Soledad *Pharomachrus mocinno* y Guacharos *Steatornis caripensis*.

ZONING: Preliminarmente se han definido como Intangible, de alta densidad de uso, de recuperación natural y de amortiguación fijada en 1 km de ancho alrededor del Parque.

DISTURBANCES OR DEFICIENCIES: Existen predios de particulares que realizan actividades de agricultura y ganadería pero que se les controla para evitar ensanchamientos.

SCIENTIFIC RESEARCH: Existen estudios sobre la avifauna del área, inventarios de flora y estudios geológicos.

SPECIAL SCIENTIFIC FACILITIES: No desarrollados pero se les ofrece alojamiento en las casetas de los guardaparques.

PRINCIPAL REFERENCE MATERIAL: Hubach, Enrique (1952). Informe sobre los alrededores de Puracé.

Roldán, Roque y Londono, Edgar (1975). Estudio Socioeconómico y Jurídico del Resguardo de Puracé. (Cauca). INCORA, Bogotá.

Milliman, James (1971). Aves del Parque nacional del Puracé. Voluntario del Cuerpo de Paz. Popayán.

STAFF: 1 Jefe del Proyecto - Ingeniero Forestal, 2 Auxiliares Técnicos, 10 Guardaparques y 15 Obreros.

BUDGET: 7,300,000 pesos Colombianos en 1980 y 4,725,000 en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque Nacional de Puracé - INDERENA - Popayán - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sánchez Páez.

INFORMATION DATED: Junio 15 1981.

(14) Parque Nacional Natural Los Katios

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1973. Ampliada su superficie 1980.

GEOGRAPHICAL LOCATION: Norte del Departamento del Choco entre la linea de frontera Colombo Panamena y la margen izquierda del Rio Atrato incluyendo las ciénagas de Tumarado al este del mismo rio y entre los rios Cacarica, Perancho y Peyé. Municipios de Riosucio - Choco y Turbo, Antioquia; 7°42'-56'N y 77°03'-19'W.

ALTITUDE: 50-600 m.

AREA: 72,000 hectáreas.

LAND TENURE: De la Nación. (Actualmente se están adquiriendo 50 mejoras de colonos, el presupuesto está asegurado y quedará el Parque libre de habitantes.)

PHYSICAL FEATURES: Topografía plana ondulada y accidentada. Se extiende a lo largo de las estribaciones de la Serranía del Darién. Comprende el Río Atrato considerado el más caudaloso del mundo. Parte del llamado Tapon del Darién se halla dentro del Parque. Por el área del Parque pasará la Carretera Panamericana en un tramo aproximado de 30 kilómetros. Según su fisiografía el área se divide en llanuras aluviales con terrazas bajas inundables, llanuras aluviales con terrazas altas poco inundables, colinas bajas hasta 250 metros y colinas hasta 600 metros y área de pantanos (Ciénagas de Tumarado y Tapon del Darién).

VEGETATION: En las orillas del Río Atrato, se pueden apreciar consociaciones de a) Espejo de Agua, especies flotantes como Oreja de Mula *Eichhornia azurea*, Lechuguilla *Pistia* sp.; b) La zona marginal de los pantanos del Tapon del Darién - Ciénagas de Tumarado predomina *Montrichardia arborescens* llamado Arracacho y que tiene rizomas con brotes lignificados y la Hierba Arraigada *Polygonum acuminatum*; c) El pantanal zona estable de enraizamiento y lignificación verdadera donde se aprecia la dominancia de Pangana *Raphia taedigera*, *Erythrina fusca*, *Pachira aquatica*, *Prioria copaifera* y *Ficus dendroica*; d) Catival que es una consociación de *Prioria copaifera* 'Cativo', frecuente en terrenos bajos e inundables, con algunas epifitas y helechos. En el interior del Parque se hallan consociaciones de a) Guipo o Ceiba Bonga *Cavanillesia platanifolia*, b) Consociaciones secundarias con *Ochroma lagopus*, *Cecropia* spp. y *Cochlospermum vitifolium* y c) *Brosimum utile* y *Castilla elastica*.

NOTEWORTHY FAUNA: Es la única área Suramericana donde habita un buen número de especies faunísticas de Centro América y entre ellos pueden citarse *Heteromys desmarestianus* y *Ortalis cinereiceps*. El área es refugio de especies en vía de extinción como la Danta o Macho de Monte *Tapirus bairdii* (V), Tigre *Panthera onca* (V), Nutria *Lutra* sp. y Babilla *Caiman crocodilus* (V). Unas 250 especies de aves se han registrado en el Parque.

ZONING: No definidas aún.

DISTURBANCES OR DEFICIENCIES: Las áreas que fueron ocupadas por colonos y propiedades privadas y que ya se adquirieron se hallan en vía de recuperación. Aún están dentro del Parque establecidos algunos cultivos de colonos que se están adquiriendo para tener al final del año de 1981 el área completamente saneada.

SCIENTIFIC RESEARCH: Se han efectuado estudios de fauna de vertebrados con énfasis en avifauna, estudios preliminares de vegetación y estudio socioeconómicos.

SPECIAL SCIENTIFIC FACILITIES: Existe un Centro Administrativo con capacidad para alojar personal científico.

PRINCIPAL REFERENCE MATERIAL: Barbosa, Cesar (1980). Estudio de Comunidades Vegetales y Algunas de sus Relaciones con Primates en el Parque Nacional Natural Los Katios. INDERENA. Bogotá.

INDERENA (1981). Informe de labores de 1980 y Proyecciones 1981. Proyecto ICA-INDERENA-USDA. División Parque Nacionales.

Organización de los Estados Americanos (1978). Proyecto Darién. Estudio para la Orientación de Desarrollo Integral de la Región del Darién Colombiano. República de Colombia. Medellín.

STAFF: 1 Director de Proyecto, 1 Pagador, 1 Almacenista, 15 Auxiliares entre obreros y celadores en la parte administrativa. En la parte operativa: 1 Ingeniero Forestal, Jefe del Parque, 1 Biologo, 2 Auxiliares técnicos, 12 Guardaparques, 30 Obreros, incluidos celadores y cocineros.

BUDGET: 41,500,000 pesos Colombianos en 1980 y 25,500,000 pesos Colombianos en 1981. El Parque Nacional Katios hace parte de un proyecto general para evitar el paso de la Fiebre aftosa a Norteamérica, mediante Convenio con el Gobierno de los Estados Unidos, quien ha venido financiando en parte el mismo.

LOCAL PARK OR RESERVE ADMINISTRATION: Director Proyecto ICA-INDERENA-USDA. INDERENA. Turbo. Antioquia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(15) Parque Nacional Natural Chingaza

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: En la Cordillera Oriental, Departamentos de Cundinamarca y Meta, Municipios de Fomeque, Quetame, La Calera, Guasca junin, Gachala, El Calvario y Restrepo; 04°21'-43'N y 73°35'-56'W.

ALTITUDE: Entre 800 a 3,800 m.

AREA: 50,000 ha.

LAND TENURE: De la Nacion en un 90 per cent aproximadamente, el resto en manos de particulares con propiedad y colonos.

PHYSICAL FEATURES: Sobre la Cordillera Oriental. La mayor parte del area esta por encima de los 2,500 metros de altura, pero en las estribaciones boscosas de la Orinoquia se encuentran elevaciones menores de 1,000 metros. La topografia es muy accidentada y en la zona de paramo existen lagunas, morrenas y otras evidencias de accion glacial. En el area se situan las cabeceras de rios importantes para el abastecimiento de aguas de Bogota y piedemonte llanero.

VEGETATION: La flora mas sobresaliente esta representada por *Weinmannia pubescens*, *Befariaglauca*, *Alnus jorullensis*, *Gynopsis paramuna*, *Hypericum* sp., *Espeletia uribei*, frailejon endemico y que alcanza hasta 11 metros de altura. Existen también un *Graminoidetum*, caracterizado por los géneros *Festuca* y *Calamagrostis*. En las partes mas bajas prosperan palmas de los género *Euterpe*, *Geonoma* y *Schellea*. En los valles pantanosos prospera el musgo *Sphagnum*.

NOTEWORTHY FAUNA: La fauna es variada, dentro de los mamiferos sobresalen: Oso de Anteojos *Tremarctos ornatus* (V), Venado Colorado *Mazama rufina*, Cusumbo *Nasua nasua*, Mono Aullador *Alouatta seniculus* y una subespecie endémica de Ardilla *Sciurus granatensis griseimembra*. Entre las aves cabe mencionar: Pava Azul *Penelope montognii*, *Anas flavirostris*, *Cinclus leucocephalus* y *Dendroica fusca*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Existen alteraciones por sobrepastoreo y quemas. La Exmpresa de Acueducto y Alcantarillado de Bogota esta adquiriendo los predios que pasaran a manos del Estado. Existe una fabrica de cemento cerca del Parque que contamina aguas.

SCIENTIFIC RESEARCH: Se han efectuado varias colecciones de aves y botanicas. También se han realizado estudios hidrométricos y geologicos.

SPECIAL SCIENTIFIC FACILITIES: Aun no desarrollados.

PRINCIPAL REFERENCE MATERIAL: Camargo, G. Luis Alfredo (1971). El Paramo como Parque nacional y Museo al Aire Libre. IU Jornada Latinoamericana de Parques nacionales. INDERENA, Medellin, Colombia.

Wallace D. McKay (1978). Nuevos Registros y Observaciones de Aves en el Parque Nacional Natural Chingaza. INDERENA, Bogota.

STAFF: 1 Ingeniero Jefe de Proyecto y 5 guardabosques.

BUDGET: 1,200,000 pesos Colombianos 1980 y 4,044,000 pesos Colombianos 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Chingaza, INDERENA, Regional Cundinamarca - Bogotas - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(16) Parque Nacional Natural Tama

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1977.

GEOGRAPHICAL LOCATION: En la Cordillera Oriental, Municipio de Toledo, Departamento del Norte de Santander; 7°92'-27'N y 72°02'-28'W.

ALTITUDE: 350-3,600 m.

AREA: 48,000 ha.

LAND TENURE: De la Nacion, con presencia de colonos que ocupan un 5 per cent del area aproximadamente.

PHYSICAL FEATURES: Su relieve es de ondulado a quebrado. Cubre tres cuencas hidrograficas importantes, correspondientes a los rios Oira, Tachira y Arauca, separados entre si por los divorcios de agua de Cruz de Piedra y la cuchilla La Aurora. Cubre varios pisos térmicos desde el paramo hasta el templado en su extremo sur que constituye la cabecera o piedemonte llanero.

VEGETATION: Cobertura vegetal formada por bosque humedo del piso térmicofrio, vegetacion de paramo y estribaciones cubiertas por bosques correspondientes al piso templado. Cuenta con notables endemismos floristicos Vgr. *Espeletia chardonii*. En general las especies mas representativas del Parque entre otras son: *Tibouchina lepidopta*, *Podocarpus rospligiosii*, *Bursera graveolens*, *Ladembergia magnifolia*, *Diplostephium revolutus*, *Espeletia hartwegiana*, *Weinmannia* spp.

NOTEWORTHY FAUNA: Sobresalen el roedor *Thomasomys hilophilus* endémico del area y el Gallito de Rocs *Rupicola peruviana aequatorialis*, con limite N.E. de distribucion en el Parque. Dentro de las especies observadas se hallan Oso Negro *Tremarctos ornatus* (V), *Lagothrix lagothricha* (V), Guartinaja *Dinomys branickii*, *Lutra* sp., *Potos flavus*, *Andigenas nigrirostris*, Aguila *Pandion haliaetus*, Guacharos *Steatornis caripensis* y *Gallinago* sp.

ZONING: Una zonificacion preliminar del Parque identifico: Zona de amortiguacion, Area de recreacion o de alta densidad de uso, Area de ambientes naturales sobresalientes, Area primitiva o intangible y Area de recuperacion natural.

DISTURBANCES OR DEFICIENCIES: En un 5% el area esta aproximadamente alterada parcialmente por la accion de colonos que se hallaban en el area antes de su establecimiento como Parque. Cultivos de subsistencia y ganaderia.

SCIENTIFIC RESEARCH: Solo se conocen de dos exploraciones científicas desde creado el Parque, de muy poca duración, especialmente para colecciones de aves y ranas.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Se desconoce, sin embargo en INDERENA se poseen varios informes de actividades desarrolladas y de planes preliminares de manejo.

STAFF: 1 Ingeniero Forestal, Jefe del Área, 4 Guardabosques, 2 Obreros.

BUDGET: 2,000,000 de pesos Colombianos en 1980 y 2,418,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque Nacional Natural Tama. INDERENA - Cucuta - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(17) Parque Nacional Natural Pisba

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Localizado en la Cordillera Oriental, Jurisdicción de los Municipios de Mongua, Socha, Tasco, Jerico, Pisba y Socota en el Departamento de Boyaca; 5°44' - 6°00'N y 72°26' - 43'W.

ALTITUDE: 2,000-4,000 m.

AREA: 45,000 ha.

LAND TENURE: La mayor parte pertenece a la Nación. Existen algunos terrenos que tienen propiedad privada y algunos colonos establecidos hace varios años.

PHYSICAL FEATURES: El Parque está dominado esencialmente por formas resultantes de la acción tectónica y de acción glaciaria pleistocénica. Dentro de él están las cuencas altas receptoras de los ríos Pauto, Tocaria y Cravojur en el Oriente y por su franja occidental tiene drenaje la cuenca del Río Chicamocha. Las temperaturas medias anuales están entre 6°C y 10°C, con lluvias abundantes durante todo el año.

VEGETATION: La mayor parte del área boscosa corresponde a la consociación del *Weinmannia* y el resto a bosques mixtos micromesófilos con dosel de 15-25 metros y bosques micronanófilos de subparamo con dosel de 3-6 metros. Gran parte del área se halla cubierta por paramos con significativos enclaves de turbera y como en otros de la Cordillera Oriental hay alto grado de endemismo como: *Espeletia oswaldiana* y *Aragoa dugandiana* entre otras. El matorral enano de *Loricaria complanata* está en el límite inferior del superparamo asociado con *Racocarpus purpurascens* y otras especies de briófitos en suelos estables.

NOTEWORTHY FAUNA: La fauna del Parque es poco conocida por falta de estudio, se han registrado entre otras especies en el área: Oso de Anteojos *Tremarctos ornatus* (V), Venados *Odocoileus virginianus goudotii* y una rana endémica del Departamento de Boyaca *Micreophis nana*. El Parque hace parte de un corredor cuaternario de intercambio de elementos bióticos entre los Andes Venezolanos, Andes Orientales y elementos Andinos Meridionales.

ZONING: No están definidas.

DISTURBANCES OR DEFICIENCIES: Existe pastoreo en el paramo bajo o algunos cultivos especialmente de papa. Extracción de lena.

SCIENTIFIC RESEARCH: En los dos ultimos anos se han efectuado reconocimientos de corta duracion con colecciones de flora y algunos batracios, cuyos informes estan inéditos.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Cleef, Antoine M. (1977). Secuencia Altitudinal de la Vegetacion de los Paramos de la Cordillera Oriental.

INGEOMINAS (1953). Fosfatos del Paramo de Pisba. Boletin Geologico, Vol No. 3.

STAFF: No tiene.

BUDGET: No se ha designado.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Regional Boyaca - INDERENA - Tunja - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(18) Parque Nacional Natural Munchique

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1977.

GEOGRAPHICAL LOCATION: Localizado en la Cordillera Occidental Municipio del Tambo, Departamento del Cauca; 2°28'-50'N y 75°36' - 76°30'W.

ALTITUDE: De 500-3,000 m.

AREA: 44,000 ha.

LAND TENURE: De la Nacion 95% y 5% de propiedad privada.

PHYSICAL FEATURES: Comprende diversos pisos térmicos. En su territorio se encuentran varias corrientes de agua dentro de las cuales las mas importantes son rios San Joaquin, Mechengue y Aguacalara. La topografia es de pendientes fuertes y los suelos compuestos por basaltos y disposicion de cenizas volcanicas en las partes altas. El area presenta ramales de la Cordillera Occidental o contrafuertes como las serrnias Sigui, La Paz y Pena Fiera. El clima va de isomicrotérnico hasta el isomegatérnico bajo la influencia de los vientos del Pacifico. La precipitacion en las partes mas altas es de 3,000 m.m. anuales y aumenta considerablemente con la disminucion de altura.

VEGETATION: La vegetacion corresponde a una Hydrophytia isomegatérnica isomesotérnica e isomicrotérnica, que equivale a bosque pluvial montano, bosque muy humedo montano bajo y bosque pluvial tropical y subtropical. Sonresalen las siguientes especies: *Billia columbiana*, *Tibouchina mollis*, *Quercus humboldtii*, *Hieronyma colombiana*, *Casearea nitida* y *Couma macrocarpa* entre las aboreas.

NOTEWORTHY FAUNA: Por la diversidad de especies de la avifauna puede considerarse el area como una de las mas importantes del pais, considerando los varios pisos térmicos que encierra y su ubicacion. Se destacan en el area el Colibri endémico de alli *Eriocnemis mirabilis*, Corbatudo *Cephalopteros penduligera*, Toropavo *Pyroderus scutatus*, Aguila Real *Oroaetus isidori* y *Pharomachrus* spp. Entre los mamiferos mas conocidos en el area estan Puerco Espin *Echinoprocta rufescens*, Tigrillo *Felis pardalis* (V), Venado *Mazama americana* y Puma *Felis concolor*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Existen colonos ubicados en los extremos Suroriental (Rio Mechengue) y Nororiental (Rio San Joaquin) que han alterado el area en parte con actividades de ganaderia y en una muy baja escala con agricultura. Estos colonos se hallaban en el Parque con anterioridad a su declaratoria. Esta area ocupada hace parte practicamente de la zona de amortiguacion (buffer zone), no definida completamente.

SCIENTIFIC RESEARCH: Se han efectuado serios estudios con énfasis en la avifauna, y otros de caracter botanico. Informacion deficiente.

SPECIAL SCIENTIFIC FACILITIES: No estan desarrollados.

PRINCIPAL REFERENCE MATERIAL: Acero, Enrique (1979). Determinaciones Botanicas del Parque Nacional Munchique. Universidad Distrital de Bogota, Facultad de Ingenieria Forestal.

Alvaro, Lobo A. (1978-1979). Informes de Actividades Parque Nacional Munchique. INDERENA.

Townsend, Wendy R. (1980). La Fauna del Parque Nacional Munchique.

STAFF: 1 Ingeniero Forestal, jefe del area, 5 Guardabosques, 3 Obreros.

BUDGET: 2,700,000 pesos Colombianos en 1980 y 1,742,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Naional Munchique, INDERENA, Popayan, Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(19) Parque Nacional Natural Los Nevados

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1973.

GEOGRAPHICAL LOCATION: Cordillera Central, Municipios de Casabianca, Villa Hermosa, Murillo, e Ibagué en el Departamento del Tolima, Santa Rosa de Cabal y Pereira en el Departamento de Risaralda, Villa Maria, Departamento de Caldas y Salento, Departamento de Quindio; 4°36'-57'N y 75°15'-30'W.

ALTITUDE: 2,600-5,400 m.

AREA: 38,000 ha.

LAND TENURE: 60% aproximadamente es de la Nacion y otro 40% se halla en manos de colonos y en propiedad privada, pero afortunadamente esta ultima porcion no tiene vocacion agropecuaria sino netamente protectora en su gran mayoria, sin embargo, realizan cultivo de papa y mantienen ganado.

PHYSICAL FEATURES: Se encuentran dentro del Parque varios volcanes nevados, El Ruiz, El Cisne, Santa Isabel, Tolima y el Quindio. El asentamiento de la vegetacion se efectua sobre arenas que reposan sobre material igneo. Pueden apreciarse estratos de lava con diferentes espesores asi como podsoles férricos, podsoles de paramo, suelos de turbera ranqueriformes y yerma andina. La conformacion de cada volcan es diferente. La importancia hidrografica es relevante, puesto que alli se originan rios que abastecen las principales poblaciones cafeteras del pais y sus cuencas hidrograficas superiores se protegen en la reserva. Varias lagunas y afloramientos termales ocurren alli.

VEGETATION: La vegetacion en general esta caracterizada por 4 tipos diferentes: a) Bosque andino, ubicado entre 2,500 y 3,200 metros con especies de aliso *Alnus*, *Jorullensis*, encenillo *Weinmannia pubescens*, Chasque *Chusquea scandens*, palmas de cera *Ceroxylon quinduensis* y *Ceroxylon ferrugineum*, Laurel de Cera *Myrica pubescens*; b) Subparamo entre 3,500 y 3,900 metros, donde la vegetacion es una mezcla del limite superior del bosque de niebla y el paramo propiamente dicho, las especies comunes son: *Hypericum laricifolium*, *Baccharis genistelloides*, *Senecio formosus*, *Myrica pubescens*, *Rumex acetosella* y el helecho *Jamesonia* sp.; c) Paramo propiamente dicho donde sobresalen *Calamagrostis* y *Festuca* entre las Gramineas y *Espeletia hartwegiana*; d) Superparamo localizado entre 4,200 y 4,600 con temperaturas bajo 0°C con vegetacion pobre, dispensa y disociada sobre suelo arenoso y grava, representada por *Senecio canescens*, *Senecio gelidus* y *Agrostis nigritella*.

NOTEWORTHY FAUNA: Las especies de mayor importancia que se encuentran en esta area son el Ave de los barrancos *Momotus momota*; se caracteriza esta especie por anidar en los perfiles de la carretera, se puede encontrar hasta los 4,500 m.s.n.m. El Papamoscas del Nevado *Muscisaxicola alpina* lelega a remontar hasta los 4,800 m.s.n.m. Entre los mamiferos tenemos: Oso de Anteojos *Tremarctos ornatus* (V), Danta de paramo *Tapirus pinchaque* (V), Venado Conejo *Pudu mephistophiles* (V) y Conejo Sabanero *Sylvilagus brasiliensis*. Entre las aves: Trogon de Montana *Trogon masssena*, Soledad *Pharomachrus pavoninus*, Tangara de Cabeza Amnarilla *Tangara xanthocephala*, Colibri Pardo *Coeligena coeligena*, Colibri Pico de Esoada *Ensifera ensifera*, Caza Moscas *Myophobus flavicans*, Falso Carpintero *Dendrocicla tyrannina*, Torcaza collareja *Columba fasciata*, Aguila Real *Buteo fuscenscens*, Aguila de cola blanca *Buteo albicaudatus*, Pato de paramo *Anas flavirostris*, Pato de los torrentes *Merganetta armata*, Pato colorado *Oxyura jamaicensis*, Gallito de roca *Rupicola rupicola*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Existen tierras de propietarios privadas y otras de colonos establecidos con anterioridad a la creacion del Parque y dedicados a ganaderia y cultivo de papa. La mayor parte de las tierras poseidas por particulares corresponden a pastos naturales, rastrojos, arenales y zonas no aptas para desarrollos agropecuarios. Se estan haciendo esfuerzos para adquirir estas tierras, para lo cual se ha determinado establecer un fondo economico con caracter exclusivo para ese proposito y buscando contribuciones del Estado y de los particulares.

SCIENTIFIC RESEARCH: Existe un estudio fitogeografico y geologico. Actualmente se esta realizando un estudio fitosociologico y se estan montando estaciones meteorologicas.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: De fraume, Mélida y Pérez, Oscar (1977). Parque Nacional Natural Los Nevados, Estudio Fitogeografico. Santa Marta.

Herrd, Darrel (1974). Glacial and Volcanic geology of the Ruiz - Tolima volcanic complex, Corillera Central. Washington - Universidad de Washington.

INDERENA - Division de Parques Nacionales (1981). Parque Nacional Natural Los Nevados. Descripcion - Problematica, Plan de Acción.

STAFF: 1 Ingeniero Agronomo, Jefe del Proyecto, 4 Guardaparques, 1 Obrero.

BUDGET: 2,700,000 pesos Colombianos en 1980 y 2,248,000 primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Los Nevados - INDERENA - Manziales - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(20) Parque Nacional Natural Las Orquideas

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12/8.3.1 (Northern Andean/Colombian Coastal).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Marzo 1973.

GEOGRAPHICAL LOCATION: Noroeste del Pais, cordillarea Occidental, Municipios de urrao, Frontino y Abriaqui, Departamento de Antioquia; 6°31'-42'N y 76°08'-25'W.

ALTITUDE: 300 a 3,850 m.

AREA: 32,000 ha.

LAND TENURE: De la Nacion o Gobierno 90% y 10% de colonos y propietarios.

PHYSICAL FEATURES: Topografia agreste y accidentada. Su parte mas elevada es el Alto de Musinga (3,850) que presenta en su ladera occidental laderas muy suaves. Alli estan los valles del rio Calles y

Carauta y el majestuoso canon del Rio Venados. Suelos desarrollados a partir de depositos volcanicos y materiales metamorficos y sedmientarios. Es importante resaltar la importancia de la proteccion en el Parque de cuencas superiores de rios que mas abajo tienen utilizacion para consumo humano e industrial.

VEGETATION: Siguiendo la clasificacion de L. Holdridge en él existen las formaciones vegetales. Bosque muy humedo tropical, pluvial, subtropical, pluvial montano bajo y pluvial montano, sobresalen en general las siguientes especies: Cacao de monte *Pachira acuatica*, *Tabebuia rosea*, roble *Quercus humboldtii*, Ceiba *Ceiba* sp., Balso *Ochroma lagopus*, Guamos *Inga spectabilis*, Pino romeron *Podocarpus* sp., Palma de cera *Ceroxylon* sp. y Sietecueros *Tibouchina* sp.. En el paramo representado se hall el frailejon *Speletia occidentalis*. Gran variedad de musgos, helechos, anturios, epifitos y parasitas. El Parque debe su nombre a las Orquideas, que en este son numerosas e incluyen especies de los géneros *Cattleya odontoglossum*, *Oncidium*, *Masde vallia*, *Epidendrum*, *Maxillaria*, *Elleantus*, *Pleurothallis*, *Stanhopea*, *Angulosa* y *Peristeria*.

NOTEWORTHY FAUNA: El area por los diversos pisos térmicos es bastante rica en especies faunisticas y reducto de algunas que se encuentran en via de extincion como el Oso *Tremarctos ornatus* (V). En aves valga mencionar *Buteo magnirostris*, *Piaya cayana*, *Andigena nigrirostris*, *Trogon collaris* y *Pyroderus scutatus* y en mamiferos se han reportado *Didelphis marsupialis*, *Microsciurus* sp. y *Sciurus granatensis* entre otros.

ZONING: No definidas aun.

DISTURBANCES OR DEFICIENCIES: Existen actividades agricolas y ganaderas realizadas por colonos ubicados en margenes de algunos rios antes de la creacion del Parque.

SCIENTIFIC RESEARCH: Existen inventarios parciales para colecciones e identificacion taxonomica de fauna y flora, pero estos pueden considerarse completamente insuficientes.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Barajas, Alberto (1971). Ubicacion y delimitacion del Parque Nacional Las Orquideas. INDERENA. Medellin.

Ospina, Mariano (1973). Bases para la planeacion y desarrollo del Parque Nacional Las Orquideas. Antioquia. Colombia.

STAFF: Ingeniero Forestal Jefe del Proyecto, Guardaparques y 3 obreros.

BUDGET: 2,500,000 pesos Colombianos en 1980 y 1,851,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Las Orquideas - INDERENA - Medellin - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(21) Parque Nacional Natural Macuira

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Localizado en el extremo Noreste de la Peninsula de la Guajira; 12°02'-15'N y 71°14'-26'W.

GEOGRAPHICAL LOCATION: De 0-80 m.

AREA: 25,000 ha.

LAND TENURE: En su totalidad de la Nacion.

PHYSICAL FEATURES: Serrania de 25 kilometros de ancho, rodeada de tierras bajas, planas y aridas, que se extiende desde llanuras desérticas hasta 800 metros. Dada su ubicacion y elevacion intercepta los vientos alisios que vienen del N.E., provocando un frente de condensacion y de nieblas en la ladera N.E. Los cerros de la serrania son muy inclinados y separados unos de otros por terrenos erodados. Las quebradas que nacen en la serrania se convierten en torrentes impasables en épocas de invierno. La precipitacion es de unos 800 m.s.n.m. al ano 'Es una Isla en el Desierto'.

VEGETATION: La parte mas septentrional de Suramerica con vegetacion humeda. En la serrania hay 5 tipos de bosques: Monte espinoso, endunas arenosas muy seco deciduo, sobresalen *Bursera simaruba* y *Lonchocarpus punctatus*, bosque seco siempreverde en el que se destaca *Clusia rosea*, bosque ripario en las margenes de los riachuelos con arboles como *Crataeva tapia* y bosque nublado con numerosas epifitas y que es el mas rico en especies, en términos generales dentro de las que sobresalen *Randia formosa*, *Rapanea guianensis* y *Cordia macuirensis*, endémica del area. Si tiene certeza de por lo menos 12 especies mas endémicas de alli.

NOTEWORTHY FAUNA: En el area se destaca una poblacion aislada y escasa de babilla *Caiman crocodilus* (V), primates del género *Alouatta*, avifauna excepcionalmente rica con 7 subspecies endémicas de la region, ademas tigrillos, armadillos y ardillas.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Muy pocas y que deben controlarse especialmente debido a pastoreo de ganado y chivos. El 90 por ciento del bosque en general se halla sin perturbacion. El resto es secundario.

SCIENTIFIC RESEARCH: Existen colecciones botanicas y de avifauna.

SPECIAL SCIENTIFIC FACILITIES: No desarrollados.

PRINCIPAL REFERENCE MATERIAL: Sugden, Andrew M. y Bernal, Henry (1978). Informe sobre algunos aspectos de la conservacion y ecologia de la Serrania de Macuira.

STAFF: 1 Jefe de area Ingeniero Forestal que comparte responsabilidad para el manejo de otra area y dos guardaparques.

BUDGET: Primer semestre de 1981 1,000,000 de pesos Colombianos.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Macuira - INDERENA - Riohacha - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Mayo 15 1981.

(22) Parque Nacional Natural Isla de Salamanca

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964 y Ratificado 1969.

GEOGRAPHICAL LOCATION: Costa del Caribe, Norte de Colombia, Departamento del Magdalena, Municipios de Sitio Nuevo y Pueblo Viejo; 10°57'-11°6'N y 74°22'-58'W.

ALTITUDE: 0-8 m.

AREA: 21,000 ha.

LAND TENURE: 90% de la Nacion. El 80% se halla en propiedad privada y un 2% ocupado por colonos.

PHYSICAL FEATURES: Isla formada por depositos en su mayoria de origen lacustre o del acarreo fluvial o marino. Delta estuario del Rio Magdalena. Su extremo Noroeste hace parte de las Bocas de

Ceniza, actual desembicadura del rio mencionado. El sector Oriental se inicio con una hilera de islillas separadas entre si por canales que con el tiempo debido al aporte de sedimentos y de arenas, conchas y detritos marinos permitio la union de esas islas. El sector Occidental esta constituido por varias ciénagas, formadas a partir de un abanico de brazos del rio Magdalena, comunicadas por una red de canales y rodeadas en su mayor parte por manglares. Existen playas arenosas con formacion local de dunas.

VEGETATION: El Parque se caracteriza por varias comunidades: a) Oligohalinas con muy escasa tolerancia a la salinidad representada por *Erythrina fusca* y *Typha dominguensis*; b) Bosque seco y espinoso representado entre otras especies por *Acacia farnesiana*, *Prosopis juliflora*, *Pereskia guamacho*, *Opuntia wentiana*, *Acanthocereus pentagonus* y *Stenocereus griseus*; c) Bosques de playa con *Coccoloba uvifera* y *Guaicum officinale*; d) Comunidades halofíticas, representadas por *Rhizophora mangle*, *Avicennia germinans*, *Laguncularia racemosa* y *Conocarpus erectus* entre los mangles y por *Batis maritima* y *Sesuvium portulacastrum*; e) Pastizales de *Sporobolus*.

NOTEWORTHY FAUNA: Una gran riqueza en avifauna con 170 especies sobresaliendo el colibri endémico *Lepidopygia lilliae*, *Molothrus armenti*, pato real *Cairina moschata*, pato cucharo *Platalea ajaja*, garzon soldado *Jabiru mycteria*. El grupo mas diversificado entre los mamíferos son los Quiropteros. Dentro de los carnívoros figuran *Panthera onca* (V), *Felis yagouaroundi* (I) y *Procyon lotor*. En los manglares son frecuentes los monos colorados *Alouatta seniculus seniculus*. *Trichechus manatus* (V). Hay en la Isla una muy buena representacion de reptiles, peces y anfibios.

ZONING: Area primitiva intangible que ocupa aproximadamente un 70 per cent del parque en su extremo occidental, area de recuperacion natural, area de recreacion general exterior y area de uso intensivo o alta densidad de uso.

DISTURBANCES OR DEFICIENCIES: Carretera comercial atravieza el Parque. Linea de alta tension electrica. Red de gaseoducto, bajo tierra que causo alteracion de vegetacion. Ruptura del balance halohidrico como consecuencia de sedimentacion de canos, interrupcion de los flujos de agua por efecto de construccion de la carretera, fuertes sequias, evapotranspiracion mayor que precipitacion, entrada de agua de mar a las ciénagas del litoral, todo lo cual ha producido condiciones de hipersalinidad hasta el punto que aproximadamente 1,700 hectareas de mangle se hallan totalmente muertas. Por otra parte aun existen en la Isla un buen numero de colonos dedicados a la agricultura de pancoger y en el extremo Sur Oriental (200 ha) se proyecta construir un complejo industrial. En proximos dias se efectuara una gran accion de dragado de los canos y construccion de obras civiles a través de la carretera con el proposito de restablecer las condiciones originales permitiendo un mayor flujo de agua dulce y asi poder reducir la salinidad.

SCIENTIFIC RESEARCH: Existen estudios obre la avifauna, moluscos, flora, insectos y algunas colecciones cientificas sobre mamíferos.

SPECIAL SCIENTIFIC FACILITIES: No desarrollados, pero en el Estacion de 'Los Cocos', hay posibilidad de alojamiento para científicos.

PRINCIPAL REFERENCE MATERIAL: Franky, Simon y Rodriguez, Pedro (1976). Parque Nacional Isla de Salamanca. INDERENA.

Hernandez, Jorge y Sanchez, Heliodoro (1979). Sinopsis de la problematica del Balance Halohidrico en el Parque Nacional Isla de Salamanca, con particular referencia a los flujos de agua preexistentes. INDERENA.

Miller, K.R. (1968). El programa de manejo y desarrollo de los Parques Nacionales de la C.V.M., Colombia. Estudio de preinversion para el Desarrollo Forestal en los Valles del Magdalena y del Sinu. Proyecto PNUD-FE: CVM-FAO. IICA. Turrialba, Costa Rica.

STAFF: Jefe del area, 1 Ingeniero Argonomo, 8 guardaparques, 15 obreros.

BUDGET: 6,100,000 pesos Colombianos en 1980 y 3,325,000 primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe de Proyecto Parque Nacional Isla de Salamanca - INDERENA - Santa Marta.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(23) Parque Nacional Corales del Rosario

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Litoral Caribe, Municipio de Cartagena, Departamento de Bolivar (Archipelago del Rosario) al sur de Cartagena; 10°04'-14'N y 75°37'-53'W.

ALTITUDE: 0 metros a menos 50 metros (area marina y submarina).

AREA: 18,700 ha.

LAND TENURE: 100 per cent de la Nacion.

PHYSICAL FEATURES: Comprende una plataforma coralina, quizas la mas importante de Colombia con aguas de poca profundidad que se extiende desde el Noreste de la Isla de Baru hasta el Archipelago del Rosario, incluyendo la faja de manglar que se encuentra al oeste de la Isla mencionada. Los arrecifes coralinos se localizan sobre base de arrecifes subfosiles de una edad de 5,000-10,000 anos. El Parque se halla rodeando las denominadas Islas del Rosario.

VEGETATION: La vegetacion terrestre del Parque se caracteriza principalmente por manglares (*Avicennia nitida* y *Laguncularia racemosa*) ubicados en la margen oeste de la Isla de Baru (unica area terrestre incluida en el Parque). En el Parque hay una gran riqueza en las praderas submarinas de *Thalassia testudinum*, que se forman en fondos arenosos de poca profundidad y en las numerosas algas *Cloroficias*, *Feoficeas* y *Rodoficeas*.

NOTEWORTHY FAUNA: En su estudio sobre el area Pfaff senala que alli hay 51 especies y formas de corales y posteriores analisis han llegado a determinar que existen 60 especies. La sucesion tipica dominante se caracteriza por *Acropora palmata*, *A. cervicornis*, *Porites porites*, *P. astreoides*, *Agarica tenuifolia* y *Montastrea annularis*. En el area queda aun una buena representacion de el Caracol *Strombus gigas*. Muchas especies de peces, moluscos y crustaceos complementan la fauna del area, ademas de especies de la avifauna como algunas migratorias que anidan alli *Pelecanus occidentalis* y *Fregata magnificens*.

ZONING: No aun definidas. Se tienen ya proyectos de delimitacion para areas intangibles y de recreacion general exterior.

DISTURBANCES OR DEFICIENCIES: El Parque tiene algunos impactos debido al turismo que llega a las islas circundantes. Los principales causantes de danos son gran actividad de construcciones en las islas, que arrojan desperdicios al agua, contaminacion con aguas negras, pesca ilicita por visitantes y nativos y un trafico de lanchas que atenta contra los arrecifes. Actualmente el control esta siendo estricto y se tiene una reglamentacion especial.

SCIENTIFIC RESEARCH: El area ha sido afortunadamente bastante estudiada y cada dia hay mas entusiasmo por desarrollar estudios detallados alli.

SPECIAL SCIENTIFIC FACILITIES: La Universidad de Bogota Jorge Tadeo Lozano tiene una sede en la ciudad de Cartagena para la Facultad de Ciencias Marinas y que por otra parte el INDERENA tiene un Centro Investigaciones Pesqueras en la misma ciudad.

PRINCIPAL REFERENCE MATERIAL: Instituto de Investigaciones Marinas de Punta de Betin (1977). Informe sobre la situacion Ecologica general de las Islas del Rosario. Santa Marta.

Pfaff, R. (1969). La Scleractinia y Milleporina de las Islas del Rosario. Mit.. Inst. Colombo Aleman Invest. Cient. 3.17-24. Santa Marta.

Duque, Fernando. Jefe Parque Nacional Corales del Rosario. Informes varios sobre la situacion ecologica del Parque Nacional Corales del Rosario. 1979-1980-1981.

STAFF: 1 Biologo Marino, Jefe del Parque, 3 guardaparques, 3 obreros.

BUDGET: 3,200,000 pesos Colombianos 1980 y 1,924,000 pesos Colombianos primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Corales del Rosario. INDERENA. Cartagena.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(24) Parque Nacional Natural Tayrona

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964 y Ratificado 1969.

GEOGRAPHICAL LOCATION: Municipio de Santa Marta, Departamento del Magdalena. Litoral Caribe, al oriente de la ciudad de Santa Marta; 11°16'-23'N y 73°53' - 74°10'W.

ALTITUDE: 0-900 m.

AREA: 15,000 ha.

LAND TENURE: La mayoría pertenece a la Nación. Aun existen 30 predios en manos de propietarios privados y que equivalen aproximadamente a 1,500 h a.

PHYSICAL FEATURES: Litoral marino con predominio de acantilados con presencia de playas de regular amplitud y plataformas submarinas adyacentes con 'praderas' submarinas y arrecifes coralinos, varias bahías o ancones protegidos con abanicos aluviales. El resto corresponde a topografía accidentada (laderas en general descendiendo de S-N) la mayor parte de los cursos de agua son temporales, una gran parte del área presenta vestigios arqueológicos de la cultura Tayrona.

VEGETATION: Aproximadamente el 90% se halla cubierto por vegetación natural, y que comprende desde bosque húmedos semicaducifolios hasta matorral xerofítico. Localmente existen algunos manglares, sobresalen varios endemismos de la región de Santa Marta como *Melocactus* sp., *Mimosa martensis* y del Litoral Caribe vgr. *Caesalpinia ebano*, *Scheleamagdalenica*. En el bosque seco se encuentran colinas bajas con *Haematoxylon* sp., *Platymiscium pinnatum*, *Pereskia colombiana*, vegas de quebradas y ríos con *Astroniun graveolens*, *Samanea saman*, *Hura crepitans* y *Bursera simaruba* y en el bosque húmedo se encuentran *Poulsenia armata*, *Ficus magdalénica*, *Anacardium excelsum* y *Cufodontia currani*.

NOTEWORTHY FAUNA: Se calcula que existen no menos de 80 especies de mamíferos que incluyen un buen número de quirópteros, el Jaguar *Panthera onca* (V), paca *Cuniculus paca*, *Cerdocyon thous*, zaino *Tayassu tajacu*, mono colorado *Alouatta seniculus seniculus*. Unas 250 especies de aves y 50 de reptiles. Además hay playas de nidación de tortugas marinas incluyendo la *Carey Eretmochelys imbricata* (E), además se han registrado 50 especies de corales.

ZONING: La zonificación incluye zona intangible, de recuperación natural, de recreación general exterior, de alta densidad de uso, histórico cultural y de amortiguación.

DISTURBANCES OR DEFICIENCIES: 30 predios de particulares que están aprovechando cocoteros y realizan actividades agropecuarias. Algunos pescadores que ilícitamente utilizan dinamita. Existen una carretera pavimentada que atraviesa parte del área inicialmente determinada intangible. Los visitantes causan algunos disturbios especialmente por contaminación con basuras.

SCIENTIFIC RESEARCH: Varios estudios sobre los vestigios arqueológicos de la cultura Tayrona. Se han hecho levantamientos geológicos, edafológicos, fitosociológicos e inventarios cualitativos de fauna (Planton marino, equinodermos, moluscos, crustáceos, insectos y vertebrados).

SPECIAL SCIENTIFIC FACILITIES: Estación biológica marina en la Bahía de Gayraca.

PRINCIPAL REFERENCE MATERIAL: La bibliografía es muy variada y dispersa, las más relevantes como guía se cita:

Franky, Simon y Rodríguez, Pedro (1967). Un enfoque para la problemática del desarrollo del Parque Nacional Tayrona. CVM. Santa Marta. 58 pp.

Grimwood, I.R. (1968). Reports and recommendations on the Sierra Nevada de Santa Marta National Park, the Isla Salamanca National Park, the Tayrona National Park, the Macarena National Reserve.

Hernandez, Jorge C. y Rodriguez, Pedro (1975). Estudio Ecologico de la vegetacion del Parque Nacional Tayrona - INDERENA.

INDERENA (1972). Division de Parques Nacionales y Vida Silvestre. El Parque Nacional Tayrona para Colombia. Tomo II.

STAFF: 1 Ingeniero Forestal Jefe del Parque, Un agronomo asistente de vigilancia, 1 Biologo, 2 auxiliares técnicos, 13 Guardaparques y 20 Operarios.

BUDGET: 12,000,000 de pesos Colombianos en 1980 y 6,712,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parque Nacional Tayrona - INDERENA - Santa Marta - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(25) Parque Nacional Natural Cueva de los Guacharos

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Noviembre 1961 - Ampliacion de su superficie en diciembre de 1975.

GEOGRAPHICAL LOCATION: Cordillera Oriental, Departamento del Huila; 1°32'N y 76°04'W.

ALTITUDE: 1,700-3,500 m.

AREA: 9,000 ha.

LAND TENURE: En su totalidad de propiedad del Gobierno.

PHYSICAL FEATURES: Se destacan en el Parque la existencia de grandes cuevas formadas a través de los anos por la accion del Rio Suaza, dentro de las cuales a su vez se encuentran formaciones geologicas especiales. La temperatura media anual es de 16°C y la precipitacion de 3,100 mm. El relieve en general escarpado.

VEGETATION: El Parque esta caracterizado por la existencia de un bosque humedo nublado en el cual sobresalen la presencia de *Trigonobalanus excelsa* especies endémica y unico sitio en el neotropico donde se ha encontrado el género *Trigonobalanus*; igualmente se encuentra: *Podocarpus rospigliosi*; *P. oleifolius*; *Quercus humboldti*; *Cedrela mejianca*, *C. montana*; *Juglans neotropica*. A partir de los 3,000 metros el bosque es reemplazado por vegetacion tipica de paramo.

NOTEWORTHY FAUNA: Se destaca la presencia del Guacharo *Steatornis caripensis*, Gallito de Roca *Rupicola peruviana*, *Tremarctos ornatus* (V), *Tapirus pinchaque* (V), *Lagothrix lagothricha* (V), *Finamus osgoodi*.

ZONING: No se han definido.

DISTURBANCES OR DEFICIENCIES: Existen algunas zonas del Parque alteradas por explotaciones agropecuarias, sin embargo, estos terrenos han sido adquiridos por el Gobierno y seran dedicados a su recuperacion natural.

SCIENTIFIC RESEARCH: Inventarios de flora y fauna. Estudios dendrologico de las especies arboreas. Estudio sobre biologia del Guacharo (*Steatornis caripensis*).. Estudio bioecologico del Gallito de Roca (*Rupicola peruviana*).

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Gertler, Paul (1979). The Birds of Cave of the Oilbirds National Park.

Henao, Jesus (1979). Informe de Labores - INDERENA.

Kysha Kewch, Roman (1973). El Guacharo, *Steatornis caripensis* del Parque nacional Cueva de los Guacharos - INDERENA.

STAFF: 1 ingeniero forestal, Jefe del Proyecto; 4 guardaparques; 5 obreros.

BUDGET: 4,600,000 pesos Colombianos en el año 1980 y 1,706,000 pesos Colombianos primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Parque Nacional Natural Cueva de los Guacharos - INDERENA - pitalito, Huila.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(1) Santuario de Fauna y Flora Arauca

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.27.10 (Llanos).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Llanos Orientales de Colombia, Intendencia de Arauca, Municipio del mismo nombre; 6°36'-53'N y 71°05'-25'W.

ALTITUDE: 200-400 m.s.n.m.

AREA: 90,000 ha.

LAND TENURE: Un 30% esta ocupada por colonos.

PHYSICAL FEATURES: La totalidad del area es plana y comprende una llanura aluvial de desborde, las partes sobresalientes estan constituidas por los diques naturales y las salidas de madre de los canos y rios antiguos. La temperatura media anual es de 27°C y la precipitacion de 2,200 m.m.

VEGETATION: El area incluye selvas de piedemonte de la Cordillera Oriental junto con sabanas, bosques de galeria y zonas pantanosas. En las selvas sobresalen: Higuera *Ficus insipida*, Ceiba Tolua *Bombacopsis quinatum*, Ceiba *Ceiba pentandra*, Guayacan *Tabebuia* sp., en los bosques de galeria se destacan las consociaciones de moriche *Mauritia flexuosa* y en las vegas de los rios las consociaciones *Guadua angustifolia*.

NOTEWORTHY FAUNA: Pueden observarse facilmente grandes grupos de Chiguiros *Hydrochaerus hydrochaeris*, Venados *Odocoileus virginianus* y bandadas de patos y garzas de diferentes especies. Sobresalen asi mismo dentro del area: Tigres *Panthera onca* (V), Pumas *Felis concolor*, Perro de Agua *Pteronura brasiliensis* (V), Nutria *Lutra longicaudis*, Danta *Tapirus terrestris*, babillas *Caiman crocodilus* (V) y una muy reducida poblacion de *Crocodylus intermedius* (E).

ZONING: No se han determinado.

DISTURBANCES OR DEFICIENCIES: Las causadas por explotaciones agricolas. Existe ademas una gran presion sobre el recurso bosque. El area sera atravesada por una carretera. El area ha sido parcialmente colonizada.

SCIENTIFIC RESEARCH: No se han realizado.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: FAO (1964). Reconocimiento Edafológico de los Llanos Orientales.

Cano, M. (1964). Reconocimiento de suelos de las zonas piloto de Arauquita, Fortul y Saravena. FAO.

STAFF: 1 Ingeniero, 4 Guardaparques, 1 Obrero.

BUDGET: 1,700,000 de pesos Colombianos en 1980 y 1,181,000 de pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Santuario Fauna y Flora Arauca. INDERENA - Arauca.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(2) Santuario de Fauna y Flora Ciénaga Grande de Santa Marta

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1977.

GEOGRAPHICAL LOCATION: Extremo S.S.W. de la Ciénaga Grande de Santa Marta. Departamento del Magdalena; 10°40'N y 74°31'W.

ALTITUDE: Maximo 20 m.

AREA: 23,000 ha.

LAND TENURE: 95% de la Nación, 5% propiedad privada.

PHYSICAL FEATURES: Corresponde a un sector de la llanura aluvial de origen reciente dentro del primitivo delta del Río Magdalena que incluye oantanos, bosques pantanosos, ciénagas, canos y bosques no inundables. El área está localizada en un piso térmico cálido isomegatérmico, semiarido con dos periodos húmedos y dos secos en el año.

VEGETATION: La vegetación está caracterizada por Manglar (*Rhizophora mangle*, *Avicennia germinans* y *Laguncularia racemosa*), Asociaciones de pantano con *Typha* sp. y *Eichhornia* y bosque inundables con presencia de *Erythrina fusca* y Bosque no inundable con una gran diversidad de especies *Ficus primoides*, *Ficus dendroica*, *Broximum* sp., *Ceiba pentandra*, Bosque de transección higrotropofito-subxerofito con predominio de caducifolias.

NOTEWORTHY FAUNA: En el área sobresalen las siguientes especies: Zorra Manglera *Procyon lotor punmilus*, Mono Colorado *Alouatta seniculus*, micobajo *Cebus albifrons*, Jaguar *Panthera onca* (V), Manatí *Trichechus manatus* (V), Guacharaca *Ortalis garrula*, Pato Cucharero *Platalea ajaja*, Chavarria *Chauna chavarría*, Patos (Anatidae) y varias aves migratorias. Caimán *Crocodylus acutus* (E), Babilla *Caiman crocodilus fuscus* (V), Iguana *Iguana iguana*. Además de gran diversidad de peces.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Solamente algunos pescadores que realizan actividades ilícitas a espaldas de guardaparques y algunos propietarios que practican la ganadería.

SCIENTIFIC RESEARCH: Inventario preliminar de aves y vertebrados.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: INDERENA (1978-80). Informes técnicos de las Divisiones de Fauna terrestre y de Parques Nacionales.

STAFF: Ingeniero Forestal, Jefe del Proyecto, 4 operarios y 4 guardaparques.

BUDGET: 1,200,000 pesos Colombianos en 1980 y 1,395,000 pesos Colombianos primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Santuario Ciénaga Grande de Santa Marta - INDERENA - Santa Marta - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(3) Santuario de Fauna Los Flamencos

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total. Cubre todos los aspectos.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Litoral Caribe, Municipio de Riohacha. Departamento de la Guajira; 11°45'N y 72°30'W.

ALTITUDE: Nivel del Mar 0-5 m.

AREA: 7,000 ha.

LAND TENURE: Pertenece a la Nacion a excepcion de unas 100 ha donde hay algunos habitantes.

PHYSICAL FEATURES: Area constituida por lagunas salobres marismas y ciénagas costeras. El complejo de ciénagas esta comunicado con el mar por la Boca de Navio Quebrada, con clima semiarido isomegatérmico, de temperatura media anual aproximadamente de 28°C, régimen biestacional de lluvias con dos 'veranos' (Diciembre - Abril y Julio - Agosto).

VEGETATION: En los sectores exentos de influencia salina, consta de un bosque subxerofito con predominio de leguminosas Mimosoideae, tales como *Prosopis juliflora*, *Acacia farnesiana*, Cactaceae como *Stenocereus griseus*, *Pilosocereus russellianus*, *Pereskia guamacho* y Capparidaceae como *Capparis* spp. El resto de vegetacion herbacea con pastizal halofilo de *Sporobolus virginianus*, *Batis maritima* y semiarbustiva halofila con manglar *Rhizophora mangle*, *Avicennia germinans* y *Laguncularia racemosa*.

NOTEWORTHY FAUNA: Corresponde a la que caracteriza algunos sectores del Litoral Caribe de Colombia y Venezuela con elementos tales como *Mazama gouazoubira*, *Sylvilagus floridanus*, *Columba corensis*, *Icterus icterus*, *Crotalus durissus*, etc. Es un lugar importante como punto de escala para migraciones aviarias especialmente de aves acuaticas. Poblaciones de Flamencos *Phoenicopterus ruber*, especie que motivo el nombre de la reserva, habitan alli.

ZONING: No existen.

DISTURBANCES OR DEFICIENCIES: El area praticamente se halla sin alteraciones. Existen algunas viviendas de indígenas pescadores en el area.

SCIENTIFIC RESEARCH: No se han realizado especificamente en el area.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: INDERENA. Informes inéditos de las Divisiones de Fauna Terrestre y Parques Nacionales.

STAFF: 1 Jefe de area, Ingeniero Forestal, 1 guardaparque y 1 operario.

BUDGET: 320,000 pesos Colombianos en 1980 y 1,300,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Parques Nacionales Flamencos - Macuira, INDERENA, Riohacha, Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(4) Santuario de Fauna y Flora Iguaque

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Junio 1977.

GEOGRAPHICAL LOCATION: En la Cordillera Oriental, Departamento de Boyaca, Jurisdiccion de los municipios de Tunja, Arcabuco y Villa de Leyva; 5°35'-44'N y 73°22'-30'W.

ALTITUDE: 2,400-3,600 m.s.n.m.

AREA: 6,700 ha.

LAND TENURE: La mitad de la tierra es de propiedad particular, pero por las características fisiograficas y de altitud solo una parte de esta es explotada economicamente con cultivos de papa y pastoreo, la otra mitad pertenece a la Nacion.

PHYSICAL FEATURES: El area corresponde a un anticlinal vaciado en comba en cuyo senso se encuentran pequenas lagunas de origen glacial, una de ellas llamada Iguaque tiene especial valor cultural por ser considerada en la mitologia chibcha, el sitio donde se origino la humanidad. El relieve es quebrado y escarpado. Los flancos del anticlinal son de pendiente fuerte. El clima presenta una graduacion en sentido Sur-Norte, comenzando con una zona semidesértica hasta la humeda en la parte norte que soporta un bosque nublado. Hay predominancia de fosiles marinos cretaceos.

VEGETATION: En los extremos Sur y sureste donde predomina un clima seco y suelos superficiales, la vegetacion esta constituida por asociaciones subxerofiticas con especies de cactaceas *Opuntia* sp., *Opuntia tunicata* y *Mammillaria bogotensis* y praderas secas de baja cobertura. El extremo Norte lo caracteriza un bosque nublado con enclaves de robledal *Quercus* spp., *Alnus jorullensis*, *Podocarpus* sp. y *Cinchona* sp. En la parte alta sobre los 2,800 m aparece un bosque mixto arbustivo con presencia de *Weinmannia* sp., *Clusia* sp. y *Diplostephium*. De los 3,200 m en adelante este bosque es reemplazado por vegetacion de paramo con predominio de frailejones endémicos regionales (*Espeletia muyska*, *E. tunjana* y *E. pleiochasia*).

NOTEWORTHY FAUNA: La fauna del area no ha sido estudiada mucho y dentro de esta sobresalen Venado cachienvainado *Odocoileus virginianus goudoti*, tinajo *Agouti taczanowskii*, zorros *Urocyon cinerercargentens*, *Cerdocyon thous apollinari*, Aguilas *Geranoaetus melanoleucus* y *Oroaetus isidori*.

ZONING: No se han definido.

DISTURBANCES OR DEFICIENCIES: Existen actividades agricolas y ganaderas incompatibles con los objetivos del Santuario.

SCIENTIFIC RESEARCH: Existe un inventario parcial de la fauna y estudio general sobre la vegetacion.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Informes varios Division Parques Nacionales, INDERENA.

STAFF: 1 Ingeniero Forestal Jefe del Proyecto, 4 Guardabosques, 2 Obreros.

BUDGET: 2,100,000 pesos Colombianos en 1980 y 1,340,000 pesos Colombianos en el primer semestre de 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe del Santuario de Fauna y Flora Iguaque - INDERENA - Tunja - Colombia.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(5) Santuario de Fauna y Flora Los Colorados

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 1977.

GEOGRAPHICAL LOCATION: Ubicado en el Departamento de Bolivar, Municipio de San Juan Neponuceno; 9°57'N y 75°07'W.

ALTITUDE: 100-250 m.

AREA: 1,000 ha.

LAND TENURE: El area ha permanecido conservada como una propiedad ejidal de la comunidad de San Juan Neponuceno, por disposiciones legales desde la colonia.

PHYSICAL FEATURES: Se trata de una montana con pendientes moderadas a fuertes, situada en la Serrania de San Jacinto, que constituye el mas importante relicto de bosque dentro del sector septentrional de dicha serrania.

VEGETATION: La totalidad de la reserva se halla cubierta de bosques subhigrofiticos con dosel de 25-30 metros con predominio de especies arboricas perennifolias salvo en el estracto emergente. La biota climacica de la Serrania de San Jacinto se caracteriza por afinidades que pueden trazarse con la biota Chocoana en abrupto contraste con la biota tropofila y con tendencia a xerofila que define la mayor parte del litoral Caribe de Colombia, esto es la provinica biotica 8.27.4. de Udvardy (Salvo el Macizo de la Sierra Nevada de Santa Marta). Existen algunos elementos endémicos tan característicos como el Palo de Vela *Parmentiera stenocarpa*.

NOTEWORTHY FAUNA: El area debe su nombre a los monos Colorados *Alouatta seniculus seniculus*. La serrania corresponde al limite septentrional dentro de Colombia de afinidad hidrofila relacionada con la biota pacifico y los refugios pleistocinicos del Sinu (cf. Parque Nacional de Paramillo) y del Nechi. Merecen mencion especies elementos tales como el Paujil *Crax alberti* (V), el Galbulido endémico *Brachygalba lugubris carmenensi* y la presencia de *Alouatta palliata aequatorialis*.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Extraccion de hojas tiernas de palmeras de Iraca *Carludovica palmata* y de palma estera *Astrocaryum malybo*, para labores de artesanía y de bejucos]ara cesteria y extraccion de lena removiendo productos muertos por parte de la comunidad local.

SCIENTIFIC RESEARCH: Reconocimientos preliminares de flora y fauna.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Mejia, Arturo C. (1977). Informe de Comision a San Juan Neponuceno. Abril de 1977. INDERENA. Bogota.

STAFF: No existe especifico. La comunidad se encarga de la conservacion.

BUDGET: No se ha establecido.

LOCAL PARK OR RESERVE ADMINISTRATION: INDERENA - Bogota.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

(6) Santuario de Flora La Corota

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1977.

GEOGRAPHICAL LOCATION: Municipio Pasto, Departamento de Narino, dentro de la laguna de la Cocha o Lajo Guamuez; 10°06'N y 77°08'W.

ALTITUDE: 2,770-2,780 m.

AREA: 8 ha.

LAND TENURE: De la Nacion.

PHYSICAL FEATURES: Isla en la Laguna de La Cocha, con relieve plano a ondulado y con diferencias de altura entre su parte mas cerca a la laguna y su parte mas alta de 10 metros, Temperatura media de 11°C y precipitacion promedia de 2,000 m.m. el ano.

VEGETATION: Es un bosque primario de la formacion Bosque miy humedo montano bajo, caracterizado por arboles, arbustos, hierbas, musgos, bejucos, orquideas y liquenes. Sobresalen las siguientes especies: Aliso *Alnus jorullensis*, Encenillo *Weinmannia tomentosa*, motilon *Hieronima colombiana*, Trompito *Boconia frutescens*, *Rubus floribundus* y *Esperomeles glabrata*.

NOTEWORTHY FAUNA: No existen registros de mamiferos en el area y no se conocen datos de la avifauna que tiene alli su habitat.

ZONING: No definidas.

DISTURBANCES OR DEFICIENCIES: Solamente lo limpado para construir unos senderos de interpretacion.

SCIENTIFIC RESEARCH: Inventario preliminar de flora.

SPECIAL SCIENTIFIC FACILITIES: Estacion biologicas con una cabana.

PRINCIPAL REFERENCE MATERIAL: No conocido.

STAFF: 1 Guardabosque.

BUDGET: El sueldo del Guardabosque 200,000 pesos Colombianos.

LOCAL PARK OR RESERVE ADMINISTRATION: Director Regional del INDERENA - Narino - INDERENA - Pasto.

NAME OF CNPPA COORDINATOR: Heliodoro Sanchez Paez.

INFORMATION DATED: Junio 15 1981.

COSTA RICA

AREA: 50,899 sq km.

POPULATION: 2,111,000 (1978).

PARKS AND RESERVES LEGISLATION: The Forestry Law of 25 November 1969 and the modifications of it in 24 August 1977 Law establishing the National Park Service provide that national parks and reserves can be created by executive decree; once created the limits can be altered only by a Congressional Law. The National Park Service has the right to recommend the creation of new parks and reserves and the expropriation of lands, set up and administer funds derived from entrance fees and special taxes, enter and inspect rural properties, seize vehicles, arms or equipment used for any illegal activities, etc., in accordance with the provisions of these laws. The laws also define the responsibilities of the Park Service and general prohibitions against certain activities by visitors to the parks and reserves. Separate additional legislation empowers the Ministry of the Economy to issue special bonds for payment of lands to be expropriated for parks and reserves.

PARKS AND RESERVES ADMINISTRATION: The National Park Service has existed since 24 August 1977 with equivalency to a General Directorate of the Ministry of Agriculture and Livestock (from 1969-1977 it was a Department within the General Forestry Directorate of the same Ministry). It has responsibility for all the parks and reserves except for the Monteverde Cloud Forest Biological Reserve and Rafael Lucas Rodriguez National Wildlife Refuge (see individual sheets). Forestry Law 4465 of 25 November 1969 defined national parks as "regions or areas... that for their scenic beauty or the national or international importance of their wildlife are to be set aside for the recreation and education of the public, for tourism or for scientific research" (Article 74). National Monuments are relatively small areas of lesser natural or historical value, or those which protect a particular resource of special importance. Biological Reserves are areas containing ecosystems/species largely unaffected by man where the ecological processes can follow their own courses with as little interference as possible. Other types of reserve also exist. The Servicio de Parques Nacionales, MAG, does not have a fixed annual budget for each of the parks and reserves under its own administration. Rather the overall budget is adjusted to meet priorities throughout the year. For 1981 the approximate budget for the Park Services system will be US\$ 1,720,602 for all normal operations and US\$ 590,760 for land acquisition (special bonds). In addition, some US\$ 75,000-100,000 is expected from international donations for projects (WWF/IUCN, RENARE, etc.). Also various other preinvestment planning funds, major bank loans and loans for other projects are underway or expected for certain individual wildland units. These last ones are indicated in the individual area sheets.

ADDRESS: Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, Apartado 10094, San José, Costa Rica.

REFERENCES: Boza, M.A. (1978). Los Parques Nacionales de Costa Rica. INCAFO, Madrid. 224 pp.
Boza, M.A. and Mendoza, R. (1981). The National Parks of Costa Rica. INCAFO, Madrid.

TOTAL AREA UNDER PROTECTION: 567,113 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 La Amistad (International)	250,000
2 Chirripo	43,700
3 Corcovado	41,789
4 Braulio Carrillo	32,000
5 Santa Rosa	21,500
6 Tortuguero	18,947
7 Rincon de la Vieja	11,700
8 Palo Verde	9,647
9 Volcán Poas	4,000
10 Cocos Island	3,200

11 Irazu Volcano	2,400
12 Barra Honda	2,296
13 Cahuita	1,700
14 Manuel Antonio*	690

Biological Reserves

1 Hitoy-Cerere	9,004
2 Carara	7,600
3 Monteverde Cloud Forest	4,500
4 Guayabo, Pajaros and Negritos Islands	147

National Reserve

1 Cabo Blanco	1,172
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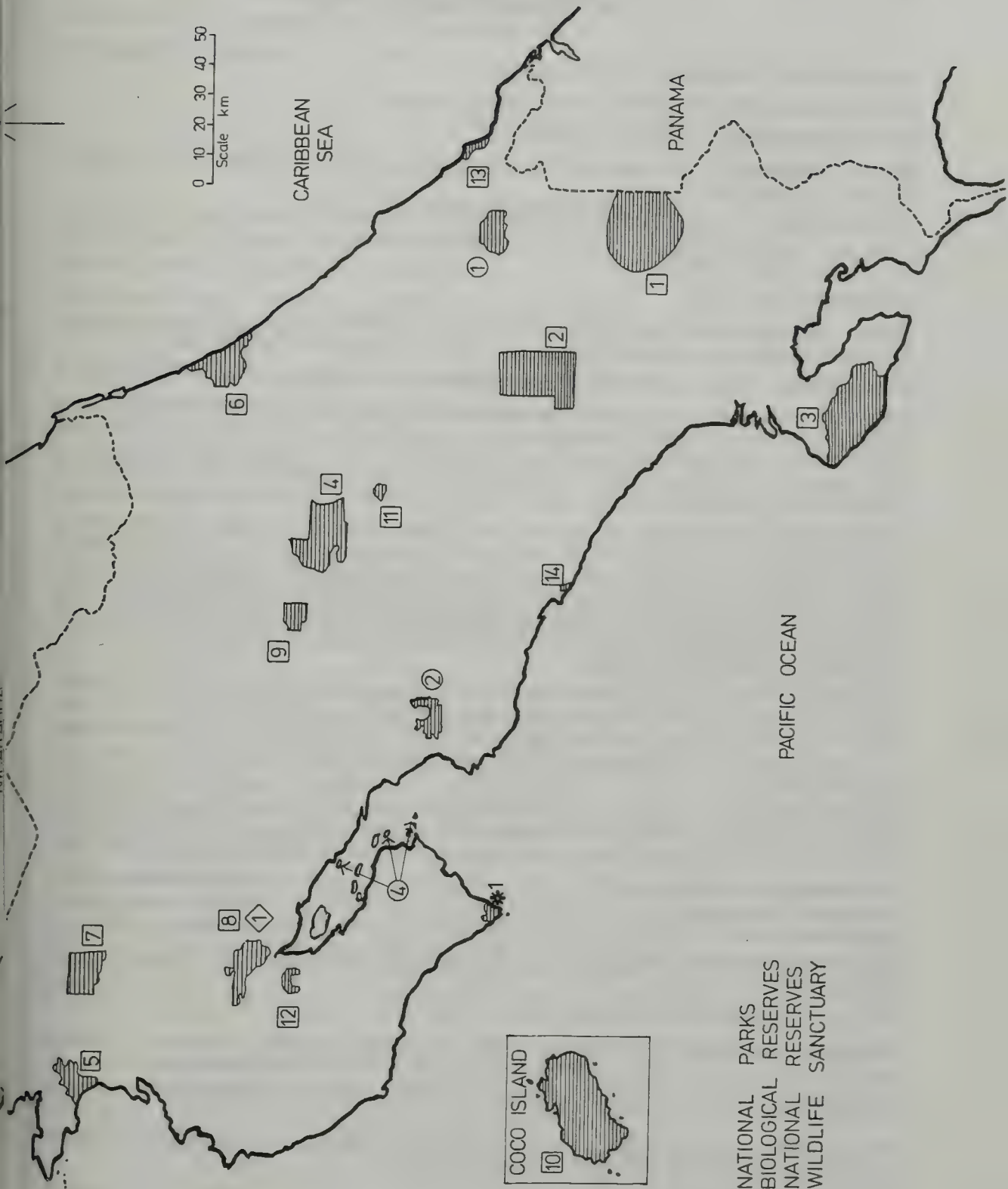
Wildlife Sanctuary

1 Rafael Lucas Rodriguez	7,000
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24 Anthropological Reserves with a total of 295,338 ha.

17 Forest Reserves with a total of 335,273 ha.

* This area is not included in **TOTAL AREA UNDER PROTECTION.**



Key.

- NATIONAL PARKS
- BIOLOGICAL RESERVES
- ★ NATIONAL RESERVES
- ◇ WILDLIFE SANCTUARY

(1) La Amistad National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: None yet in Panama.

DATE ESTABLISHED: The presidents of Costa Rica and Panama jointly declared intent to establish the park on 3 March 1979.

GEOGRAPHICAL LOCATION: The park lies across the Panamanian/Costa Rican border, within Limon and Puntarenas Provinces in Costa Rica, and Boscas de Toro and Chiriqui Provinces in Panama; 8°50'-9°32'N, 82°38'-83°10'W.

ALTITUDE: 200-3,550m.

AREA: Approximately 450,000 ha (200,000 ha in Panama, 250,000 ha in Costa Rica). Final boundaries and size to depend on the planning efforts to be carried out during the last part of 1981.

LAND TENURE: Mostly government land in both countries, but catastral surveys are incomplete.

PHYSICAL FEATURES: The Cordillera de Talamanca, where the proposed park will be located, is the highest and wildest non-volcanic mountain range in Central America. The Cordillera runs from near Cartago province in Costa Rica to an area near Volcan Baru in Chiriqui Province, Panama. A series of peaks, massifs, small valleys and slopes, swampy *Sphagnum* areas, paramos, important Atlantic and Pacific watersheds, waterfalls and other features of the landscape lie within the proposed park boundaries.

VEGETATION: Of the 20 life zones of Costa Rica, at least nine occur in the park; the numbers are similar for Panama. The area includes lowland tropical wet rainforest to cloud and paramo forests. Most of the main crest lies within the Montane Rainforest life zone, characterized by mixed oak forest - a dense, low and heavily covered forest with bryophytes, ferns, bromeliads, orchids and other epiphytes. Below 2,500m the Lower Montane Rainforest life zone is encountered and the forest is generally more mixed. On high points along the ridge, at elevations above 2,900-3,100m, there are frequently stands of paramo, swamps and *Aretostaphylos arbustoides*.

NOTEWORTHY FAUNA: Signs of tapirs, possibly of a species as yet unrecorded for Costa Rica *Tapirus terrestris*, are abundant at Cerros Utyum, Kamurk and Fabrega on the Costa Rican side but near the Panamanian border. *Bothrops nigriviscidis*, a green and black high altitude viper that has been rarely seen or collected, is present. The resplendent quetzal *Pharomacrus mocinno* (V) is present in the park as are many other species.

ZONING: None yet. Over the next two years RENARE (Panama), Servicio de Parques Nacionales (Costa Rica), the CATIE Wildlands and Watershed Unit and probably other agencies from each country will conduct natural and cultural resource inventories and elaborate a management plan for the area.

DISTURBANCES AND DEFICIENCIES: On both sides there are several Indian Reservations near or contiguous with the area plus several large farms within the initially proposed boundaries. Land squatters on the Pacific side in Costa Rica are known to exist. The situation is still being investigated in Panama.

SCIENTIFIC RESEARCH: Several studies have been carried out dealing mainly with vegetation and geological items.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Weber, H. (1959). Los Paramos de Costa Rica y su concatenacion fitogeografica con los Andes Suramericanos. Instituto Geografico Nacional. 67 pp.

Weston, A.S. (1981). Paramos, cienegas and subparamos forest in the eastern part of the Cordillera de Talamanca. Tropical Science Centre. 14 pp.

STAFF: None yet; RENARE Panama and National Park Service of Costa Rica will assign personnel to work part-time with CATIE personnel on management plan.

BUDGET: The governments of Costa Rica and Panama have assigned US\$ 600,000 for resource inventory and management planning for 1981-83.

LOCAL PARK OR RESERVE ADMINISTRATION: None yet; best to contact J.M. Rodriguez, Director del Servicio de Parques Nacionales, MAG, San José, Costa Rica, or D. Tovar, Subdirector, Direccion Nacional de Recursos Naturales Renovables, Panama, or C. MacFarland, Head,

Wildlands and Watershed Project, CATIE, Turrialba, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(2) Chirripo National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 July 1975 by congressional law 5773.

GEOGRAPHICAL LOCATION: In the south central part of the Cordillera de Talamanca; 9°20'-38'N, 83°20'-34'W.

ALTITUDE: 1,220-3,819m.

AREA: 43,700 ha.

LAND TENURE: Government expropriated lands by law. Some small peripheral private holdings are still being purchased.

PHYSICAL FEATURES: The highest mountain in Costa Rica is the central feature of the park. There are extensive paramos and cloud forests, and a system of lakes of glacial origin (formed during the Pleistocene), which with a number of other glacial features are found above 3,400m. The park protects a large watershed system and a very diverse fauna and flora. The rocks of the Chirripo Range are largely igneous in origin, and include quartz diorite, grained diorite, and smaller amounts of granite. Chirripo Peak is of grained diorite, and diorite rocks with a surface layer of fine-grained granite. Some areas of the paramo are frequently flooded during the rainy season, while in the dry season the only source of water is in the glacial lakes.

VEGETATION: i) Lower Montane Rainforest; ii) Montane Rainforest; iii) Subalpine Rain Paramo, with the treeline at 3,300m. The paramo has four types of vegetation: a) small shrub stratum (with stunted shrubs growing no higher than 4m); b) the chusqueatum (with the endemic dwarf bamboo *Swallenochloa subtessellata*); c) the graminetum (occupying clearings in the dwarf bamboo); d) fissure vegetation (on the rocks and in rock cracks). The other life zones have various oaks *Quercus* spp. as the predominant trees.

NOTEWORTHY FAUNA: Among the mammals are Baird's tapir *Tapirus bairdii* (V), jaguar *Panthera onca* (V), puma *Felis concolor*, red brocket *Mazama americana* and rabbit *Sylvilagus brasiliensis*. *Bolitoglossa subpalmata*, a salamander, is very common. Among the birds are the volcano junco *Junco vulcani*, sooty robin *Turdus nigrescens*, red-tailed hawk *Buteo jamaicensis*, rose-throated hummingbird *Selasphorus flammula*, wren-thrush *Zeledonia coronata* and barred parakeet *Bolborhynchus lineola* in the paramo and quetzals *Pharomachrus mocinno* (V) in good numbers at lower elevations in the cloud forest. The fauna of the paramo is fairly poor when compared with the forested areas.

ZONING: None yet applied; a team of professors and students from the Universidad Nacional de Costa Rica is currently working on the first phase management plan.

DISTURBANCES OR DEFICIENCIES: The only noteworthy disturbance was a fire in March 1976 which burned approximately 90% of the paramo. It is recovering.

SCIENTIFIC RESEARCH: A general inventory of natural resources is being done by Universidad Nacional Team, and the same group is studying regeneration of burned-over paramo in permanent quadrats.

SPECIAL SCIENTIFIC FACILITIES: Very limited; there is a fairly extensive system of primitive trails and three small shelter huts in various locations.

PRINCIPAL REFERENCE MATERIAL: Chaverri, A., Vaughan, C. and Poveda, L.J. (1976). Informe

de la gira efectuada al macizo de Chirripo a raíz del fuego ocurrido en marzo de 1976. Univ. Nacional, mimeo, 27 pp.

Vaughan, C. (1979). Various personal communications to C. MacFarland.

STAFF: A superintendent, 6 guards and a labourer.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Franklin Somarribas (Superintendent), Parque Nacional Chirripo, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(3) Corcovado National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 October 1975 and 30 September 1976 by executive decrees 5357 and 6385 respectively. Though still within the park, Cano Island was declared a biological reserve on 9 March 1978 under law 6215.

GEOGRAPHICAL LOCATION: On the Peninsula de Osa in Puntarenas province, southwestern Costa Rica; 8°30'N, 83°35'W.

ALTITUDE: Sea level to 750m.

AREA: 41,789 ha.

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: A rainforest with densely forested coastal hills, estuaries, marshy plains, rivers and beaches. The coastal plains are composed of Quaternary alluvial deposits, while the highlands are made up of volcanic and sedimentary rocks of the Cretaceous. The park also includes the Isla del Cano, of about 320 ha, which has some archaeological importance. The rainfall varies from a minimum of 3800mm/year on the coast to 5500mm/year in the interior lowlands and probably goes up to 6500mm or more at higher altitudes. Rainfall data are estimations by Tosi (1975) based on the vegetation characteristics.

VEGETATION: Based on the vegetation characteristics, the park has been divided into four associations: a) hilly forest: trees of up to 65m high and diameters of up to 1.5m. There are about 100 species of trees and palms per hectare. b) lowland forest: in the gallery forest in this association *Anacardium excelsum* is the dominant tree species and sometimes attains a height of 50m; there are about 45 tree species per ha. Other species present are *Termonalis lucida*, *Ficus* spp., *Brosimum panamense*, *Virola surinamensis* and the palm *Cryosophila guagara*. c) poorly drained marshes, lagoons and forest in the lowlands. The tree species that occur here are *Carapa guianensis*, *Ficus* spp., *Pterocarpus officinalis*, *Hernandia didymantha*, *Bravaisia integerrima*, *Cecropia* spp., *Euterpe* spp. and pure stands of the swamp palm *Raphia taedigera*. d) estuaries with species like *Mora excelsa* and the mangroves *Rhizophora mangle* and *Avicennia nitida*. On the beaches can be found the coconut palm *Cocos nucifera*, mahoe *Hibiscus tiliaceus*, wild cacao *Herrania purpurea* and coco palm *Chrysobalanus icaco*. The island is largely forested.

NOTEWORTHY FAUNA: Four species of sea turtle annually visit the beaches of Corcovado to lay eggs. These are the olive Ridley turtle *Lepidochelys olivacea* (E), green turtle *Chelonia mydas* (E), the hawksbill *Eretmochelys imbricata* (E) and leatherback *Dermochelys coriacea* (E). The mammal species most frequent in the park are Baird's tapir *Tapirus bairdii* (V), collared peccary *Tayassu tajacu* and red brocket *Mazama americana*; all of these are the natural food source of the jaguar *Panthera onca* (V).

Also recorded are the tiger cat *Felis tigrina* (V), ocelot *F. pardalis* (V), margay *F. wiedii* (V) and jaguarundi *F. yaguaroundi* (I) amongst the cats, and the giant anteater *Myrmecophaga tridactyla* (V) (Boza and Mendoza, 1981). Geoffrey's spider monkey *Ateles geoffroyi* (V) is found in the park, and the Central American or red-backed squirrel monkey *Saimiri oerstedii* (E) is found in the 'Reserva de Cuenco Corcovado' (see Thornback and Jenkins, 1982) - presumably the Corcovada National Park. Two noteworthy reptile species are *Crocodylus acutus* (E) and *Caiman crocodilus fuscus* (V). The bird fauna is represented by the harpy eagle *Harpia harpyja* (R) and boat-billed heron *Cochlearius cochlearius*. The 1,000 ha freshwater marsh which floods during the rainy season is also a refuge for many waterfowl (as well as reptiles and amphibians). In total some 285 species of bird have been recorded within the park, along with 139 species of mammal, 116 of amphibians and reptiles (including 42 frogs) and 16 freshwater fish. The invertebrate fauna is also very diverse, and includes numbers of large butterflies of *Papilio*, *Coligo*, *Morphus* and *Anaea* spp.

ZONING: A zoning system is being elaborated for the park.

DISTURBANCES OR DEFICIENCIES: Access is difficult, but for some years part of the area was occupied by squatters who deforested about 5% for agriculture and animal husbandry activities. This area is now recuperating. Due to the new extension of the park, several upper watersheds were included, which were traditionally the principal locations used for mines by 'coligalleros' (gold prospectors). This extension has caused some problems for the park. The administration is putting emphasis on control of the coligalleros and reduction of their activities within the park.

SCIENTIFIC RESEARCH: For several years research was carried out in an area named Rincon, near the park, principally by students training in tropical ecology from different universities of the United States and other countries. There has been an increased use of the park by numerous researchers during the last three years. Lists have been published of the species of trees, mammals, birds, amphibians and reptiles.

SPECIAL SCIENTIFIC FACILITIES: There are minimum facilities but several field stations are under construction and there are now five different sites with minimal facilities.

PRINCIPAL REFERENCE MATERIAL: Tosi, J. (1975). La Cuenca de Corcovado en la Peninsula de Osa. IUCN/WWF. Centro Cientifico Tropical, San José, 18 pp.

Vaughan, C. (1979). Plan Maestro del Parque Nacional Corcovado. Tesis Magister Scientie, CATIE, Turrialba, 380 pp.

STAFF: A superintendent, 13 guards and nine labourers.

BUDGET: The Park Service will receive approximately US\$ 70,000 for further refinement of the management plan, followed by major funding of its implementation as part of a major integral development project of the entire Osa Peninsula (World Bank loan funds).

LOCAL PARK OR RESERVE ADMINISTRATION: Maria Elena Mora (Superintendent), Parque Nacional Corcovado, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(4) Braulio Carrillo National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 27 April 1978, by executive decree 8357-A.

GEOGRAPHICAL LOCATION: The park is located in the highlands of the Central Plateau, about 25km north of San José; 10°10'N, 84°00'W.

ALTITUDE: 500 to 2,900m.

AREA: 32,000 ha.

LAND TENURE: Mostly government lands; expropriation of the remainder is in progress.

PHYSICAL FEATURES: The park has erosive formations of great dimensions, including canyons, gorges and V-shaped valleys. The rocks are predominantly of volcanic origin and the park contains two dormant volcanoes, Barba and Cacho Negro. The topography is very steep and broken, with great altitudinal range. The area has a very wet climate, and there are many streams, waterfalls and several lakes.

VEGETATION: The major types are: i) Premontane Rainforest, ii) Lower Montane Rainforest, iii) Tropical Humid Forest, iv) Premontane Humid Forest, v) Montane Rainforest. The flora is very diverse, and in the first two vegetation types there is in some areas a proliferation of all kinds of epiphytes and other herbaceous plants and bushes. 84% of the area is covered by primeval forest, and 5% by secondary forest.

NOTEWORTHY FAUNA: Among the mammals are Baird's tapir *Tapirus bairdii* (V), mantled howler *Alouatta palliata*, white-throated capuchin *Cebus capucinus*, Geoffroy's spider monkey *Ateles geoffroyi* (V), red brocket *Mazama americana* and probably all five species of Central American felids, four of which are classed as vulnerable in the IUCN Mammal Red Data Book (Thornback and Jenkins, 1982). Over 500 species of bird have been recorded in the park, including the Montezuma oropendola *Gymnostrinops montezuma*, Gray's robin *Turdus grayi*, the black-faced solitaire *Myadestes melanops* and the quetzal *Pharomachrus mocinno* (V). The fauna is extremely diverse, but needs inventory and further study.

ZONING: None yet developed.

DISTURBANCES OR DEFICIENCIES: A new road is being constructed through the centre of the entire park. This is causing extensive slides. One of the principal objectives of the park will be to minimize the road's impact and use it to best advantage for park studies. There is a small amount of deforestation for agriculture and animal husbandry on some borders but this is coming under control.

SCIENTIFIC RESEARCH: Very little in the area *per se*; some basic natural resources inventory work is now being carried out by Universidad de Costa Rica professors and students. There is extensive biological literature of the research conducted at the nearby 'La Selva' field station.

SPECIAL SCIENTIFIC FACILITIES: None in the area *per se*, but the 'La Selva' field station, which belongs to the Organization of Tropical Studies (OTS), is relatively close.

PRINCIPAL REFERENCE MATERIAL: Chaves, G. (1978). Algunas consideraciones sobre los posibles problemas biogeograficos sobre la cuenca del Rio Sucio. Unpublished thesis.

Rojas, M. (1979). Plan preliminar de desarrollo: Parque Nacional Braulio Carrillo. Unpublished manuscript.

STAFF: A superintendent, two assistant superintendents, eight guards and five labourers.

BUDGET: The Park will receive approximately US\$ 2,500,000 1981-85 for the preparation of a management plan, interpretative-environmental education plan and the implementation of those plans, under an AID-Government of Costa Rica project on management of natural resources.

LOCAL PARK OR RESERVE ADMINISTRATION: Jose Manuel Cartin, Parque Nacional Braulio Carrillo, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(5) Santa Rosa National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 20 March 1971, by executive decree 1562-A, though part of the area was protected earlier as a national monument (1 July 1966 by law 3394).

GEOGRAPHICAL LOCATION: The Park is located on the Pacific coast in the northwest province of Guanacaste, 30km northwest of Liberia (the provincial capital). The eastern border is marked by the Pan-American highway, the western by the Pacific Ocean; 10°44'-55'N, 85°34'-43'W.

ALTITUDE: Sea level to 319m.

AREA: 21,500 ha (including 11,600 ha of Murcielago area).

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: About 40% of the park is flat, the remainder hilly. The annual rainfall is about 2,000mm and the mean annual temperature is 28.2°C. During the rainy season (May to November) many lagoons of different sizes are formed. There are about 5km of white beaches on the Pacific Ocean. Volcanic rock of high calcium carbonate underlies the western region; sedimentary sandstone occurs on the coastal flank. Salt flats or 'salinas' are found along littoral lowlands. The original Hacienda was one of the first and most important cattle ranches of the region and dates back to before 1751. In 1856 it was the site of the 'Battle of Santa Rosa'. The House ('Casona') of Hacienda Santa Rosa has become the historical landmark of the successful 'Campaign of 56-57' in which Costa Rica upheld her independence.

VEGETATION: Dry forest life-zone (*sensu* Holdridge) including savannas with some forest, gallery forest, estuaries and 5km beach. Main vegetation types: 1) mixed deciduous forest with *Calycophyllum candidissimum*, *Bombacopsis quinatum*, and *Luehea candida* among the dominants, and with fig trees *Ficus* sp. and rosewood *Dalbergia retusa* also represented; 2) evergreen gallery forests along streams and behind the occasionally flooded zone (estero); 3) savannas of the exotic jaragua grass *Hyparrhenia rufa* with scattered trees of *Byrsonima crassifolia* and *Curatella americana*; 4) oak forests and savannas with *Quercus oleiodes* dominant; and 5) mangroves *Rhizophora mangle*, *Avicennia nitida*, *Conocarpus erectus* and *Laguncularia racemosa*. There is also beach vegetation, and areas of calabash *Crescentia* sp. forest.

NOTEWORTHY FAUNA: Due to the rapid clearing of the Guanacaste landscape for timber and subsequent use of pasture, Santa Rosa National Park will soon be one of the last large tracts of originally widespread tropical dry forest and lowland. Since the establishment of the park, the increment of some animal populations has been notable, the white-tailed deer *Odocoileus virginianus* particularly so. Other mammal species which are gradually regaining their previous status are white-lipped peccary *Tayassu pecary*, collared peccary *Tayassu tajacu*, tapir *Tapirus bairdii* (V), white-face monkey *Cebus capucinus* and the spider monkey *Ateles geoffroyi* (V) (apparently the park is the last refuge of the subspecies *A. g. frontatus*); howler monkey *Alouatta palliata*, collared anteater *Tamandua tetradactyla*, jaguar *Panthera onca* (V), margay *Felis wiedii* (V), jaguarundi *F. yagouaroundi* (I) and ocelot *F. pardalis* (V) are also found within the park. The avifauna is well represented in the area. Among the bird species the following are the most common: scarlet macaw *Ara militaris*, rufescent tinamo *Crypturellus cinnamomeus*, spot-bellied bobwhite *Colinus leucopogon*, great curassow *Crax rubra*, crested guan *Penelope purpurascens*, blue-winged teal *Anas discors*, roseate spoonbill *Platalea ajaja*, thick knee *Burhinus bistriatus*, parrots *Amazona albifrons*, anhinga *Anhinga anhinga*, jabiru *Jabiru mycteria*, ibis *Eudocimus albus* and the laughing falcon *Herpetotheres cachinnas*. In the estuaries small individuals of *Caiman crocodilus fuscus* (V) and *Crocodylus acutus* (E) have been observed. On the Naranjo and Nancite beaches during the breeding and mating season (August to December) in 1971, over 288,000 turtles arrived to nest. The majority of them were the Pacific Ridley turtle *Lepidochelys olivacea* (E). The Pacific green turtle *Chelonia mydas* (E), the leatherback turtle *Dermochelys coriacea* (E) and the hawksbill *Eretmochelys imbricata* (E) also use the beaches quite extensively to nest. There are numerous crabs around the mangrove swamps, and sea snakes are frequently washed up on the shore.

ZONING: The park is zoned as follows: 1) historic zone, including the large old house (Casona), one museum and an old stone corral; 2) recreation zone with some facilities for picnics (drinking water, tables, fireplaces, sanitary services, etc.) on two sites, one close to the old house and the other near Naranjo beach; 3) education zone, which has a nature trail with interpretative signs located in the deciduous forest,

and many other signs along the main road explaining different historical, faunal and vegetative aspects; 4) protected or biological zone, including most of the park and the beaches; 5) administration zone, located about 1km from the old house, and covering 2 ha; housing for the staff of the park is located here.

DISTURBANCES OR DEFICIENCIES: In the past there were problems with rather constant invasions of cattle from neighbouring ranches, frequent forest fires in the dry season and turtle egg collecting and poaching. These are now all under control and only occasional illegal hunting is a problem. The new addition of the Murcielago Ranch area is completely deforested because of the cattle ranching activities.

SCIENTIFIC RESEARCH: Corcovado National Park and Santa Rosa National Park are the two conservation units most utilized by national and international researchers in the country. Research has been dealing with local fauna, savanna succession and effects of fire, and behaviour, ecology of the Ridley turtle *Lepidochelys olivacea* and bat feeding.

SPECIAL SCIENTIFIC FACILITIES: A research centre, including herbarium, library, projection room and dark room.

PRINCIPAL REFERENCE MATERIAL: Miller, K.R. and von Borstel, K.R. (1968). Proyecto Parque Nacional Historico Santa Rosa, Guanacaste, Costa Rica. Instituto Costarricense de Turismo, Instituto Interamericano de Ciencias Agricolas de la OEA, 76 pp.

STAFF: A superintendent, three guides, 15 guards and 2 labourers.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Sigifredo Marin (Superintendent), Parque Nacional Santa Rosa, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(6) Tortuguero National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 7 September 1970, executive decree 1235-A and 28 October 1975, law 5680.

GEOGRAPHICAL LOCATION: On the Atlantic coast in the Tortuguero plains of Limon state; 10°22'-32'N, 83°23'-34'W.

ALTITUDE: Sea level to 299m.

AREA: 18,947 ha, and the sea within the territorial waters.

LAND TENURE: Government expropriated lands by law (the few small remaining private lands are being purchased now).

PHYSICAL FEATURES: Include beach, estuary and rainforest, the latter covering 140 sq km of palm swamps (crossed by many narrow canals or 'canos') and a long series of hills called 'Lomas de Sierpe'. The rocks are all of recent origin, with the Sierpe Peaks being composed of Quaternary volcanic activity, and the plains of Quaternary alluvium, apparently formed by a coalescence of deltas. The climate is hot and one of the wettest in Central America, with about 5,000mm annual rainfall and virtually no dry season. The mean annual temperature is close to 25°C.

VEGETATION: The flora is very diverse, with large areas of relatively undisturbed heterogeneous tropical wet forest, some almost pure stands of 'cativo' *Prioria copaifera* and the swamp palm *Raphia taedigera*. Other species present are *Carapa guianensis*, *Virola* spp., *Pantaclethra macroloba*, *Rhizophora*

mangle and *Coccoloba uvifera*. Coconut trees *Cocos nudifera* are very abundant on the beaches, as are the seeds of the purple beach bean *Mucuma sloanii*. Much of the land is flooded for part if not all of the year, and grasses (Gramineae), sedges (Cyperaceae) and herbaceous plants are particularly abundant in these areas. The water hyacinth *Eichhornia crassipes* on which the manatee feeds is the most common aquatic plant in the park.

NOTEWORTHY FAUNA: It is thought that populations of manatee *Trichechus manatus* (V) still occur in the park. The beaches of the park are extensively used for nesting by the Atlantic green turtle *Chelonia mydas* (E), making the park one of the most important areas on the Caribbean coast of America for the conservation of this species. Other sea turtle species which visit this area are the hawksbill *Eretmochelys imbricata* (E) and the leatherback *Dermochelys coriacea* (E). Loggerhead turtle *Caretta caretta* (V) has also been recorded here, but only once in 15 years of observation. Also found are tapir *Tapirus bairdii* (V), (which is particularly abundant in the swamp palm groves), jaguar *Panthera onca* (V), puma *F. concolor*, ocelot *F. pardalis* (V), giant anteater *Myrmecophaga tridactyla* (V) and kinkajou *Potos flavus*. The following bird species are some of the notable ones: green macaw *Ara ambigua*, king vulture *Sarcorampus papa*, green ibis *Mesembrinibis cayennensis*, olivaceous cormorant *Phalacrocorax olivaceus* and the anhinga *Anhinga anhinga*. Among the fish recorded here is the gar *Atractosteus tropicus* which is unusual because of the bony ganoid scales which cover its body. There are also a number of crabs which are particularly abundant, *Ocypode quadratus* (on tree trunks), *Geocarcinus lateralis* and *Cardisoma guanhumi* (on the canal banks).

ZONING: None yet applied. A preliminary management plan has been drawn up providing two alternative zoning schemes. The Costa Rican Park Service is currently reviewing and revising the plan.

DISTURBANCES OR DEFICIENCIES: Egg collecting and turtle hunting are still a problem in the park.

SCIENTIFIC RESEARCH: Research on turtles, and in particular on *Chelonia mydas*, has been carried out here for more than 20 years by Archie Carr of the University of Florida (USA). There has also been some work done on vegetation, fishes, lizards and the dynamics of *Raphia* stands.

SPECIAL SCIENTIFIC FACILITIES: There is a large field station that offers some minimum facilities.

PRINCIPAL REFERENCE MATERIAL: Caldwell, D.D., Ogren, L.H. and Giovannoli, L. (1959). Systematic and ecological notes on some fishes collected in the vicinity of Tortuguero, Caribbean coast of Costa Rica. *Rev. Biol. Trop.* 7-33.

Carr, A. (1967). Caribbean green turtle; imperilled gift of the sea. *National Geographic* 131 (6): 876-890.

Carr, A. and Hirth, H. (1962). The ecology and migration of sea turtles, 5. Comparative features of isolated green turtle colonies. *Amer. Mus. Novitates* No. 2091, 42pp.

Morris, D. *et al* (1978). A management plan for the use and development of Tortuguero National Park: Preliminary draft.

STAFF: A superintendent, an assistant superintendent, a biologist, 14 guards and 2 labourers full time.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Franklin Chaves, Parque Nacional Tortuguero, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(7) Rincon de la Vieja National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 22 April 1974, law 5398.

GEOGRAPHICAL LOCATION: Located in the 'Cordillera Volcanica de Guanacaste', Guanacaste province, in the northwestern part of Costa Rica; 10°35'N, 85°30'W.

ALTITUDE: 640 to 1,916m.

AREA: 11,700 ha.

LAND TENURE: The government has initiated land expropriation from those people who have land titles, and the resettlement of squatters. Some of the area is still privately owned.

PHYSICAL FEATURES: The main feature of the park is the Rincon de la Vieja volcano that, with the Cerro Santa Maria, forms the larger mass of the cordillera. The volcano has three craters, (each one displaying collapse characteristics), and one lagoon. The last eruption was observed over 10 years ago, but some fumarole activity still occurs in one of the craters. In the base of the volcano are several minor craters or pailas (from 0.5m to 10m in diameter) with mud in ebullition; 32 rivers and 16 intermittent streams originate in the vicinity of the volcano, and flow into Tempisque, a river of enormous importance for irrigation of agricultural land in the province. The dry season occurs from August to December, and annual rainfall is about 2,500mm. Very diverse flora and fauna.

VEGETATION: Four different kinds of forest are present: a) Tropical Wet Forest where *Quercus* spp. (in the poor and eroded soil), *Spondias* spp., *Achras sapota*, *Cedrela odorata*, *Rhedia edulis* and *Enterolobium cyclocarpum* are common species. b) Premontane Moist Forest, floristically very rich. c) Premontane Rainforest with very rough topography. d) Lower Montane Rainforest where stands of *Clusia* spp. occur, sometimes mixed with a few other species (including palms). This forest is cloudy and wet all year and the trees are dwarfed because of the strong winds and the sandy soils.

NOTEWORTHY FAUNA: The area is one of the last forest refuges remaining in the Guanacaste province. The quetzal *Pharomachrus moccino* (V) is present, among many other bird species (estimated at over 200 species), and humming birds (Trochilidae) are common. Mammals, amphibians and reptiles are abundant and it is known that the threatened jaguar *Panthera onca* (V) is found in the park. So far there are no detailed lists of the fauna from this area.

ZONING: None yet applied. A management plan was elaborated in 1978 and is now being reviewed and revised by the Costa Rican Park Service.

DISTURBANCES OR DEFICIENCIES: Due to the agricultural and animal husbandry practices, the lower and middle parts of the area were heavily deforested. These activities have been stopped since the park was established (save for occasional minor disturbances due to cattle grazing) and processes of regeneration are underway (though this is slow because of the poor soils).

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Salas, S. (1971). Parque Nacional Rincon de la Vieja, mimeo, 15 pp.

Sanford, R. and Chaves, L. (1976). Plan de accion para el Parque Nacional Rincon de la Vieja, mimeo, 10 pp.

Various authors (1978). Plan de Proteccion, Uso y Desarrollo del Parque Nacional Rincon de la Vieja. Preliminary draft. Servicio Parques Nacionales de Costa Rica.

STAFF: A superintendent.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Herman Haug (Superintendent), Parque Nacional Rincon de la Vieja, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(8) Palo Verde National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 13 June 1980 by executive decree 11541-A.

GEOGRAPHICAL LOCATION: Guanacaste province; 10°25'N, 84°22'W.

ALTITUDE: 3-200m.

AREA: 9,647 ha, contiguous with the 7,000 ha Rafael Lucas Rodriguez Wildlife Refuge.

LAND TENURE: The government is in the process of expropriating the land by law.

PHYSICAL FEATURES: As for the Rafael Lucas Rodriguez Wildlife Refuge. A complex of small to medium size lagoons cover a large area of the park. Many of them are connected when the Rio Tempisque floods during the rainy season. Much of the area is marshy. The mean annual temperature is 27°C and rainfall 1,300-1,500mm.

VEGETATION: Resource inventories have not yet been carried out, but the vegetation is quite similar to that of Rafael Lucas Rodriguez Wildlife Refuge.

NOTEWORTHY FAUNA: This park is a refuge for waterbirds, and many species, resident and migratory, are present in the lagoons. Presumably the fauna is the same as that occurring in the Rafael Lucas Rodriguez Wildlife Refuge.

ZONING: No management plan or zoning scheme has yet been developed.

DISTURBANCES OR DEFICIENCIES: Not yet identified.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Organization for Tropical Studies (1971). The Book, OTS. San José, Costa Rica, 350 pp.

STAFF: None have yet been designated.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981

(9) Volcán Poas National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 23 December 1970, by law no. 4714.

GEOGRAPHICAL LOCATION: In the central highlands, 60km by road from the capital, San José, and about 10km west of Braulio Carrillo National Park; 10°10'-14'N; 84°12'-16'W.

ALTITUDE: 1,600-2,708m (summit of volcano).

AREA: 4,000 ha.

LAND TENURE: Government expropriated lands by law (mostly); some private holdings in peripheral areas and in northern and southern sections.

PHYSICAL FEATURES: The volcano is in the northwestern corner of the Central Valley and part of the Cordillera Central. Poas, of Pliocene origin, exhibits five craters, four ancient and one still active. The latter is easily reached and from it another ancient, lagoon-filled crater at a higher elevation is within walking distance. Recent activity has been documented since 1828, with especially strong eruptions recorded for the periods 1888-1895, 1903-1912 and 1952-1954. The rock strata consist of andesites and basalt. Average annual rainfall is 1,750mm, and mean annual temperature varies between 12°C and 15°C according to elevation. There is much cloud and occasional frost, especially during the drier period of January to April.

VEGETATION: Lower montane and montane wet (cloud) forests, characterized by several species of tall natives oaks, *Quercus* spp., with the smaller *Clusia odorata*, *Didymopanax pittieri* and *Wimannia pinnata* reaching the higher fringes. Many species of epiphytic orchids and bromeliads, ferns and mosses are well represented, as well as aquatics such as *Isoetes storkii*. Other notable members of the flora include *Podocarpus standleyi*, *P. oleifolius*, *Magnolia poasana*, *Gunnera insignis*, and tree ferns of the genera *Cyathea* and *Alsophylla*. Areas affected by recent volcanic activity support low, tangled scrub with *Clusia odorata*, *Vaccinium consanguineum* and *Escallonia poaensis*. An interesting plant succession has been taking place near the crater since its last major eruption in 1954.

NOTEWORTHY FAUNA: Of the mammals, the endemic Poas mountain squirrel *Syntheosciurus poasensis* is fairly common. Species formerly more abundant in the area but now rarely observed include brocket deer *Mazama americana* and collared peccary *Tayassu tajacu*, but it is doubtful whether any Baird's tapir *Tapirus bairdii* (V) or jaguar *Panthera onca* (V) still occur. In general, the fauna is rather impoverished due to the isolation of the mountain caused by intensive agriculture at lower elevations, but the birds are interesting and the quetzal *Pharomachrus mocinno* (V) can still be seen in the vicinity.

ZONING: These include: i) strict nature reserve zone covering about two-thirds of the park and denied to public access; ii) outdoor recreation zone with roads, trails and other recreation facilities for tourist use, including the park centre; iii) service zone; iv) interpretative zone with extensive interpretative facilities being developed.

DISTURBANCES OR DEFICIENCIES: Cattle grazing still occurs on privately held portions of the park.

SCIENTIFIC RESEARCH: A number of studies have been done, particularly on vulcanology and geomorphology, but also some on the flora and fauna. Accessible year-round by road from San José.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Boza Loria, M.A. (1968). Plan de Manejo y desarrollo para el Parque Nacional Volcan Poas, Costa Rica. *Tesis Mag. Sc. Turrialba*, Costa Rica, Instituto Interamericano de Ciencias Agrícolas de la OEA (Quotes references to scientific publications).

Macey, A. (1975). The vegetation of Volcan Poas National Park, Costa Rica. *Rev. Biol. Trop.* 23 (2): 230-255.

Putney, A. (1974). Plan de Interpretacion: Parque Nacional Volcan Poas. Documento Técnico de trabajo No. 12, Proyecto FAO, RLAT/RF. 199, 84 pp.

Sanchez, J.M., Mena, Y. and Morales, R. (1980). Plan para el Desarrollo del Programa Interpretativo. SPN/CATIE. 72 pp.

Sanchez, J.M., Mena, Y. and Morales, R. eds. (1980). Parque Nacional Volcan Poas: Plan para el desarrollo del programa interpretativo. CATIE, Turrialba, Costa Rica. Informe Técnico No. 3, 72 pp.

STAFF: A superintendent, an assistant superintendent, 6 guides, 5 guards and 3 labourers.

BUDGET: The Park Service is in the final stages of implementing a loan of approximately US\$2,500,000 for development of parts of the park (access roads, visitors' centre, trails etc.) and a second loan is under negotiation. Both loans are from the Central American Bank for Economic Integration (BCIE)

LOCAL PARK OR RESERVE ADMINISTRATION: Luisa Alfaro, Superintendent, Parque Nacional Volcan Poas, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(10) Cocos Island National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.43.13 (Cocos Island).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 July 1978, by executive decree no. 8748-A.

GEOGRAPHICAL LOCATION: An island in the Pacific ocean, about 500km west of Costa Rica and 630km northeast of the Galapagos Islands; 5°30'-34'N, 87°01'-06'W.

ALTITUDE: Sea level to 900m.

AREA: 3,200 ha.

LAND TENURE: Entirely government land.

PHYSICAL FEATURES: The park includes the main island plus ten islets nearby offshore. There are imposing cliffs (some up to 90m) covered with thick vegetation, and many rocky crags and islets. Inland the terrain is mountainous with numerous streams and rivers. The island is composed of volcanic agglomerates, tuffs and chiefly of lava flows. Annual rainfall is estimated at 7,000mm, and there is no dry season. There are two safe bays; Wafer Bay is more attractive to visitors but Chatham Bay is more sheltered with a small rocky beach. This island has been known to mariners and cartographers since the first half of the sixteenth century; it was a stopping place of pirates, privateers and whaling vessels.

VEGETATION: The vegetation of the island is all Premontane Rainforest, Basal Belt Transition. It has two major associations, the littoral zone with *Erythina fusca*, *Cocos nucifera*, *Anonna glabra* and several ferns (up to about 50m) and the mountain zone with *Saccoglottis* spp., *Euterpe* spp., Lauraceae, bromeliads, orchids, mosses and ferns. There are many endemic species, but endemism is not as high as in the Galapagos.

NOTEWORTHY FAUNA: Two endemic lizards, *Anolis townsendi* and *Sphaerodactylus pacificus*, but no amphibians. Seven species of land birds, which include *Buorides virescens*, *Pandion haliaetus*, *Coccyzus ferrugineus*, *Nesotriccus ridgwayi* and *Pinaroloxias inornata* (the famed 14th species of Darwin's finches, family Geospizidae; the other 13 occur in the Galapagos Islands), and many marine birds including both the magnificent and greater frigate birds *Fregata magnificens* and *F. minor*. There are no native mammals, but the early settlers of the island brought domestic animals such as cats and pigs, which have established sizeable feral populations. There are also several species of freshwater fish. Many of the native faunal species are endemic.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: It is not known to what extent introduced mammal species may be disturbing the native fauna and flora. A number of cultivated plants were also introduced. Up to the recent past Cocos was visited more or less regularly by passing vessels and yachts, and littering and other minor disturbances were common; this is now under control.

SCIENTIFIC RESEARCH: Over the years a number of taxonomic-level studies have been done, particularly on ferns, birds and lizards; however in total there has been very little research.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Gomez, L.D. (1975). Contribuciones a la pteridologia costarricense. *Brenesia* (6): 19-57.

Hertlein, L.G. (1963). Contribution to the Biogeography of Cocos Island. *Proc. Cal. Acad. Sci.* 32 (8): 219-289.

Slud, P. (1967). The Birds of Cocos Island (Costa Rica). *Bull. Am. Mus. Nat. Hist.* 134 (4): 263-295.

STAFF: 3 guards.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(11) Irazu Volcano National Park

MANAGEMENT CATEGORY: V (Protected Landscape).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 30 July 1955, by law 1917.

GEOGRAPHICAL LOCATION: In the central highlands, Cartago province, about 10km due northeast in a straight line from the city of Cartago; 9°58'N, 83°50'W.

ALTITUDE: 2,900-3,432m (summit of the volcano).

AREA: 2,400 ha approximately (final limits are still not fixed; this hectarage is based on the law which established that a 2km radius around all Cost Rica volcanoes are National Parks).

LAND TENURE: About two-thirds government land; the rest private holdings.

PHYSICAL FEATURES: The volcano has five craters. The only present signs of activity are fumaroles located on the northwest slopes, though previous eruptions have covered the surrounding lands with millions of tons of ash. On the slopes of the mountains there are areas of impressive cliffs. In the rainy season several lagoons form in the bottom of the craters.

VEGETATION: After the last eruptions (1963-65) the vegetation in the zone above the tree line was completely destroyed. It has now largely recovered, especially the beautiful shrub association of *Vaccinium consanguineum*, *Arctostaphylos rubescens* and *Pernetia coriacea*. Below the timber line oak forest, mostly *Quercus costarricensis*, is the dominant vegetation type in non-cleared areas.

NOTEWORTHY FAUNA: Most noteworthy are the birds such as the rose-throated hummingbird *Selasphorus flammula*, volcano junco *Junco vulcani*, mountain robin *Turdus nigrescens*, *Dendrocopus villosus*, black guan *Chamaepetes unicolor*, band-tailed pigeon *Columba fasciata*, *Diglossa plumbea* and quetzal *Pharomachrus mocinno* (V). Among the mammals are *Sciurus* sp., *Sylvilagus brasiliensis*, coyote *Canis latrans*, Mexican porcupine *Coendu mexicanus* and brocket deer *Mazama americana*. In general the fauna is scarce and not obvious to the general observer.

ZONING: A new management plan was elaborated by a SPN/CATIE team. The document, still in draft form, has been revised by SPN personnel. This plan recommends a change of management category from National Park to National Monument, including in the same unit the 500 ha Ricardo Jimenez National Recreation Area.

TOURISM: The area is very scenic and used heavily for tourism. A good road connects the volcano with the cities of Cartago and San José.

DISTURBANCES OR DEFICIENCIES: Below the tree line (about 3,100m) much of the area around 60% of the flanks of the craters is very disturbed (they are mostly private lands for dairy cattle and some potato farming) and dairy farming is increasing in the least disturbed areas to the north and northeast. A large number of television and radio relay antennas exist on the crater rims.

SCIENTIFIC RESEARCH: Considerable research has been done on the geology of the area; very little on biological aspects.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: CATIE/Servicio de Parques Nacionales (1981). Plan de Manejo y Desarrollo del Monumato Nacional Volcan Irazu. 180 pp (draft).

STAFF: A superintendent, a guide, 7 guards and 2 labourers. (Note: The Costa Rica Tourism Institute was in charge of the area until about two years ago; the Park Service began active management in 1978).

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Gerado Chaves (Superintendent), Parque Nacional Volcan Irazu, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(12) Barra Honda National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 20 August 1974, by law 5583, the boundaries being fixed by executive decree 5558 on 5 October 1979.

GEOGRAPHICAL LOCATION: Located in Nicoya Peninsula, 12 km northeast of Nicoya, Guanacaste Province; 10°8'-12'N, 85°20'-25'W.

ALTITUDE: 20-575m.

AREA: 2,296 ha.

LAND TENURE: All the lands are private property and the area still lacks a survey to allow expropriation proceedings to begin.

PHYSICAL FEATURES: The Park has several limestone-capped hills and they form a series of crescent-shaped ridges. There are a number of beautiful caves, varying from vertical shafts or pits, to enlarged rifts, to dome-like chambers. Other limestone features such as potholes and springs are also common. The dry season lasts about 6 months; annual rainfall is about 1,800mm and mean annual temperature 28°C.

VEGETATION: The natural vegetation is semi-deciduous, with broadleaf-evergreen and broadleaf-deciduous trees. Due to the presence of a distinct dry season, the dominant vegetation is coarse grass with low trees and shrubs in stands of varying density. Climbing vines and epiphytes are numerous.

NOTEWORTHY FAUNA: Due to previous and actual agricultural practices, the area does not have a very rich fauna. However, there are notable populations of mammals such as howler monkey *Alouatta palliata*, white-tailed deer *Odocoileus virginianus* and birds such as great curassow *Crax rubra*, black vulture *Coragyps atratus*, bicoloured hawk *Accipiter bicolor*, white-tailed hawk *Buteo albicaudatus* and magpie-jay *Calocitta formosa*. Ocelot *Felis pardalis* (V) and tiger cat *F. tigrina* (V) have also been recorded by park staff. Several species of bats inhabit the caves, and the cave fauna is in fact fairly abundant, also including several species of cricket, beetle, snail, salamander, rat, birds and fish.

ZONING: No management plan or zoning scheme yet elaborated.

DISTURBANCES OR DEFICIENCIES: There is considerable disturbance, especially due to cattle grazing and other agriculture. The area should perhaps be surveyed to determine if 'National Park' is the most appropriate classification. The caves have remained fairly undisturbed, largely because of the lack of horizontal entrances.

SCIENTIFIC RESEARCH: Several studies have been done on the geology of the caves and limestone hills.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Mora, S. (1978). Estudio geológico de los cerros Barra Honda y Alkrededores. San José, Univ. de Costa Rica. 173 pp.

Wells, S.G. (1974). Report on the geologic reconnaissance of the Cerros Barra Honda. University of Cincinnati, Cincinnati, USA. mimeo. 29 pp.

STAFF: A superintendent and 2 labourers.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Sergio Leon, Superintendent, Parque Nacional Barra Honda, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(13) Cahuita National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 September 1970, by executive decree 1236-A.

GEOGRAPHICAL LOCATION: The park is south of the town of Cahuita in southeastern Limon province on the Atlantic coast; 9°40'-48'N, 82°45'-50'W.

ALTITUDE: Sea level to 10m.

AREA: Total 1,700 ha (with 1,100 ha of land, and 600 ha of water/coral reef).

LAND TENURE: The terrestrial part is mostly under private ownership; the government is expropriating lands.

PHYSICAL FEATURES: The park follows the shoreline of the Caribbean for approximately 10km. There is a currently forming fringing reef 6.5km long and about 300m from the beach (this is the only extensive coral reef in Costa Rica). The Punta Cahuita is formed on emergent ancient coral. The bedrock of the terrestrial sector is Pleistocene alluvial sandstone. The climate is hot and wet with annual rainfall close to 3,500mm, mean annual temperature about 25°C with a brief dry season between January and February.

VEGETATION: An almost undisturbed tropical moist forest association is found on the point itself with the following tree species: *Prioria copaifera*, *Carapa guianensis*, *Anacardium excelsum* and *Calophyllum brasiliense*. In the old abandoned cocoa plantations *Cordia alliodora* and *Hura crepitans* are the dominant species. A pure stand of swamp palm *Raphia taedigera* occupies the southwest corner of the park and coconut palm *Cocos nucifera* lines the stretch of beach. The marine vegetation includes areas of turtle grass *Thalassia* sp., and a total of about 120 species of seaweeds.

NOTEWORTHY FAUNA: Common mammals include the howler monkey *Alouatta palliata*, three-toed sloth *Bradypus tridactylus*, red squirrel *Sciurus granatensis* and the margay subspecies *Felis wiedii pirrensis* (V). Some of the bird species frequent in the area are the brown pelican *Pelecanus occidentalis*, green ibis *Mesembrinibis cayennensis*, great skua *Catharata skua*, bridled tern *Sterna anaethetus*, sooty tern *S. fuscata*, green macaw *Ara ambigua*, white-collared manakin *Manacus candei*, the long-tailed tyrant *Colonia colonus* and various species of ant-wrens *Myrmothercula* spp. Among the many reptile species represented here are the basilisk *Basiliscus vittatus* and the famous fer-de-lance *Bothrops asper*. The Atlantic hawksbill turtle *Eretmochelys imbricata* (E) feeds on turtle grass, which grows in association with horny corals and sponges. Closer to the reef edge brain corals predominate with squirrel and surgeon fish, lobsters, stinging and short-spined urchins and polychaete worms. Horny corals and snappers are common on the seaward face of the reef. Wellington (1974) found 34 species of coral in the park. Crabs are abundant, both on the beach and in the freshwater streams.

ZONING: A team composed of personnel of the Costa Rican National Park Service and CATIE have developed a master plan. The document is now under review by Park Service personnel.

DISTURBANCES OR DEFICIENCIES: In the recent past a considerable area was cleared for cocoa and bananas; this is no longer permitted. Harvesting of coconuts is allowed along the beach, but causes no real problems.

SCIENTIFIC RESEARCH: An extensive marine resources inventory has been completed. Several additional studies on terrestrial flora and fauna are carried out each year by visiting scientists.

SPECIAL SCIENTIFIC FACILITIES: Rustic, simple laboratory facilities and skiffs with outboard motors for marine research are available.

PRINCIPAL REFERENCE MATERIAL: Cordoba Jaramillo, T. (1967). Estudio sobre los recursos sociales de la region cacafera de Cahuita en la zona atlantica, Costa Rica. Tesis Mag. Sc. Turrialba, Costa Rica: Instituto Interamericano de Ciencias Agrícolas.

Lemieux, G. (1969). Oportunidades para el desarrollo turistico del litoral atlantico al sur de Puerto Limon, Costa Rica. Tesis Mag. Sc. Turrialba, Costa Rica: Instituto Interamericano de Ciencias Agrícolas.

Wallis, Orthello L. (1972). The significance of Cahuita National Monument. Departamento de Parques Nacionales, San José, Costa Rica.

Wellington, G.M. (1974). An ecological description of the marine and associated environments at Monumento Nacional Cahuita. San José, Subdirección de Parques Nacionales. 81 pp.

STAFF: A superintendent, 4 guides, 5 guards and two labourers.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Juan Miguel Sanchez (Superintendent), Parque Nacional Cahuita, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(14) Manuel Antonio National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 15 November 1972, by law 5100.

GEOGRAPHICAL LOCATION: The park is located on the Pacific coast, 7km south of Quepos in Puntarenas Province; 9°23'N, 84°09'W.

ALTITUDE: Sea level to 100m.

AREA: 690 ha.

LAND TENURE: Lands being purchased by government expropriation.

PHYSICAL FEATURES: Most of the area consists of a string of wide, white, sandy beaches with high cliffs, offshore islands and a background of lush tropical forest. The beaches are covered with sand derived from coral. The main rock types are of Cretaceous origin, with limestone cliffs and islands, and some pillow lavas. Only has 3 months of dry season, with about 3,900mm of annual rainfall. Mean annual temperature is 26.6°C.

VEGETATION: The area is located on the transition belt between the tropical very wet forest and tropical wet forest life zones. The common tree species in the area are *Hymenaea courbaril*, *Ficus* spp., *Bursera simaruba*, *Ceiba pentandra*, *Enterolobium cyclocarpum*, *Cedrela odorata* and rosewood *Dalbergia retusa*. There are several swampy places where mangrove tree species such as *Rhizophora mangle* and *Avicennia nitida* grow.

NOTEWORTHY FAUNA: The zone where the park is located is accepted as the northern limit of squirrel monkey *Saimiri oerstedii* distribution; also found is the white-faced monkey *Cebus capucinus*. There are over 200 species of birds, including Swainson's toucan *Ramphastos swainsonii* and brown pelican *Pelecanus occidentalis*. Along the rocky areas many invertebrates such as urchins, sponges, brittle stars and a variety of molluscs can be found. Fishes include the yellow and black striped sergeant major *Abudefduf saxatilis*, damselfish *Eupomacentrus acapulcoensis* and trunkfish *Acanthostracion* sp. There are some small corals offshore.

ZONING: A new management plan (1981) defines six different use zones for the park, moving the camping zone away from the beach, and other public use opportunities. The zones are intangible, primitive, extensive use, intensive use, recuperation and special use. The marine area of the park is not yet zoned due to lack of basic information. The plan also calls for various buffer zones adjacent to the park including a major one for controlled tourism-recreation development on an adjacent beach.

DISTURBANCES OR DEFICIENCIES: Some contamination from nearby hotels and housing, and the area is rather small for effective protection.

SCIENTIFIC RESEARCH: Survey studies/inventories of the terrestrial flora and vegetation and the

marine resources are now being contracted with the Tropical Science Centre.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Segura, F. (1976). Analisis critico del Parque Nacional Recreativo Playas de Manuel Antonio y proposicion de un plan maestro para su uso y proteccion. M.S. Tesis, Univ. Costa Rica, 75 pp.

Servicio de Parques Nacionales y CATIE (1981). Plan de Manejo y Desarrollo del Parque Nacional Manuel Antonio. 120 pp.

STAFF: A superintendent, 4 guides, 5 guards and 3 labourers.

BUDGET: Approximately US\$ 70,000 has been obtained from the National Planning Office for scientific surveys/inventories mentioned above and detailed site and construction planning based on the management plan. The Central American Bank for Economic Integration will probably provide US\$ 500,000 for the first stage of the plan's implementation (1982-83).

LOCAL PARK OR RESERVE ADMINISTRATION: Juan Dobles, Superintendent, Parque Nacional Manuel Antonio, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Hitoy-Cerere Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 4 April 1978, by executive decree 8351-A.

GEOGRAPHICAL LOCATION: On the lower slopes of the Talamanca Cordillera, on the Atlantic side of southeastern Costa Rica; the reserve lies between the Braulio Carrillo and Cahuita National Parks; 9°35'N, 83°05'W.

ALTITUDE: From 300 to 1,025m.

AREA: 9,004 ha.

LAND TENURE: Mostly governmental; some private holdings to be expropriated.

PHYSICAL FEATURES: The reserve lies nestled amongst three Indigenous Reserves (Estrella, Talamanca and Telire) and consists of the very broken, steep topography of the lower Talamanca Cordillera slopes. It is a nearly quadrangular area surrounded by steep mountains, and has a single outlet to the Vallé de Estrella.

VEGETATION: Not yet adequately investigated, but presumed to consist mostly of undisturbed Premontane Humid Forest and Tropical Humid Forest; presumed to have a rich flora. A number of trees of some economic importance are found within the reserve, including the wild cashew *Anacardium excelsum*, andiroba *Carapa guianensis*, Santa-Maria *Calophyllum brazilienbse*, *Aspidosperma megalocarpum* and the balsa *Ochroma lagopus*.

NOTEWORTHY FAUNA: Not yet adequately investigated, but assumed to have a rich, undisturbed fauna typical of such forests, most of the five species of felids, Baird's tapir *Tapirus bairdii* (V), several monkeys etc.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Some minor deforestation in a few settled areas, but mostly undisturbed.

SCIENTIFIC RESEARCH: None yet.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Bonilla, A. (1979) and Glick, D. (1979) pers. comm. to C. MacFarland.

STAFF: A superintendent and 3 parks guards.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Guillermo Mata, Superintendent, Reserva Biológica Hitoy-Cerere, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(2) Carara Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 30 April 1978, by executive decree 8491-A.

GEOGRAPHICAL LOCATION: Inland from the Gulf of Nicoya, Pacific coast, due west of San José, and southwest of the city of Orotina; 9°45'-57'N, 84°32'-45'W.

ALTITUDE: 10 to 638m.

AREA: 7,600 ha.

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: A hilly region located in the Pacific lowlands, in which a number of streams and rivers develop. The rocks are mainly oceanic basalt, basalt agglomerate, sandstones, limestones, diabase and gabbro, laid down predominantly in the Cretaceous. These are in many cases overlain by more recent sediments. The upland area is highly faulted, with faults lying on a northeast-southwest line. There is a great climatic variety within the reserve, and this coupled with the altitudinal range means that the area is of special scientific interest. The area serves as a refuge for many threatened wildlife species because of the degradation of the surrounding land. It is also of some cultural importance and contains numerous cacique tombs.

VEGETATION: Tropical Humid Forest and Tropical West Forest. The area is still little investigated but presumably has a very diverse flora. Wild senna *Cassia reticulata* (Caesalpinaceae) is found here, the leaves of which are used by the indigenous people to fight a skin disease and to treat rheumatism. The avocado *Persea americana* is also present, along with fruits of the genus *Inga* and the coyol palm *Acrocomia vinifera* and the butternut tree *Caryocar costaricense*.

NOTEWORTHY FAUNA: Among the mammals are white-tailed deer *Odocoileus virginianus*, howler monkey *Alouatta palliata*, spider monkey *Ateles geoffroyi* (V), white-lipped peccary *Tayassu tajacu* and collared peccary *T. pecari*. Presumed to contain many others plus a diverse fauna in general, but still little investigated.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Problems with illegal hunters have been reported.

SCIENTIFIC RESEARCH: Some preliminary work has been carried out, particularly on the flora, and the National Park Service and National University are developing a joint programme of research and fieldwork.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Bonilla. A. (1979). Plan preliminar de la Reserva Carara. Unpublished manuscript.

STAFF: A superintendent, 3 guards and 2 labourers.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Lucrecia Monterrosa (Superintendent), Reserva Biologica de Carara, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganaderia, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(3) Monteverde Cloud Forest Biological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1972.

GEOGRAPHICAL LOCATION: On the Cordillera de Tilaran, Guanacaste Province, northwestern Costa Rica; 10°23'N, 85°46'W.

ALTITUDE: From 1,400-1,870m.

AREA: 4,500 ha.

LAND TENURE: The land is owned by the Tropical Science Centre, which is managing the area. The Tropical Science Centre will give the ownership rights of the Reserve to the Costa Rican Park Service in the future.

PHYSICAL FEATURES: A cloud forest on the top of a mountain range, in the Continental watershed divide. It is one of the few cloud forests left in Costa Rica. The topography varies from undulating to rough. In the forest there is a constant rainfall due to the high amount of condensation produced by the clouds when they reach the foliage of the trees. The total annual rainfall in the area is from 3,800 to 6,000mm, and the annual average temperature is about 18°C.

VEGETATION: The life zones represented in the area are: Premontane Wet Forest, Premontane Rain Forests, Lower Montane Wet Forest, Lower Montane Rain Forest. Part of the crest of the mountain range is formed by elfin woods. The more frequent species in the reserve are *Clusia* spp., *Hillia* spp., *Cecropia polyphlebia*, *Brunellia costaricensis*, *Quercus* spp., *Persea schiedeana*, *Persea americana*, *Ficus* spp., *Panopsis costarricensis*, *Capapris pseudocacao*, *Matayba oppositifolia*, *Pithecelobium brenesi*, *Utricularia* spp., *Chusquea* spp. and *Heliconia* spp.

NOTEWORTHY FAUNA: The endemic golden frog *Bufo periglenes* is the most peculiar animal in the reserve. Some feathers found and properly identified indicate that there is a population of oilbird *Streptopelia caripensis* known to occur only in South America and Trinidad. Other interesting bird species are quetzal *Pharomachrus moccino* (V), harpy eagle *Harpia harpyja* (R), ornate hawk-eagle *Spizaetus ornatus*, black guan *Chamaepetes unicolor*, green macaw *Ara ambigua*, umbrella bird *Cephalopterus glabricollis*, three-wattled bellbird *Procnias tricarunculata*, azure-hooded jay *Cyanolyca cucullata* and the wren thrush *Zeledonia coronata*. There is also a large diversity of mammal species including Baird's tapir *Tapirus bairdii* (V), white-lipped peccary *Tayassu tajacu*, brocket deer *Mazama americana*, white-tailed deer *Odocoileus virginianus*, margay *Felis wiedii* (V), jaguarundi *F. yaguarundi* (I), ocelot *F. pardalis* (V), puma *F. concolor*, jaguar *Panthera onca*, giant anteater *Myrmecophaga tridactyla* (V), white-faced monkey *Cebus capucinus*, spider monkey *Ateles geoffroyi* (V) and the howler monkey *Alouatta villosa* (I).

ZONING: No management plan or zoning scheme. There is a network of nature trails that cross the reserve in all directions. Some trails are not for use by regular visitors, only visiting scientists and staff.

DISTURBANCES OR DEFICIENCIES: None reported save for minor problems with palm-heart collecting during Easter week; some recently acquired lands are recuperating.

SCIENTIFIC RESEARCH: Many studies have been carried out by researchers and students, particularly on birds and vegetation.

SPECIAL SCIENTIFIC FACILITIES: There is a new field station with complete facilities (dormitory, food and laboratory space). Two shelters in the forest provide rustic facilities.

PRINCIPAL REFERENCE MATERIAL: Anon. (1975). Monteverde Cloud Forest Preserve Tropical Science Centre. 5 p (mimeographed).

Tosi, J. (1975). Parque Nacional Cordillera de Tilaran IUCN/WWF Tropical Science Centre. 17 pp.

STAFF: An administrator, 1 guard and 3 workers.

BUDGET: During 1975-77 the Reserve was financed by WWF with US\$ 11,500 each year. For new land acquisitions WWF helped with US\$ 68,000 in 1976. Other donations per year total about US\$ 3,000, plus approx. US\$ 5,000 in entrance fees.

LOCAL PARK OR RESERVE ADMINISTRATION: Dr Joseph A. Tosi, Director, Tropical Science Centre, Apartado 8-3870, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(4) Guayabo, Pajaros and Negritos Islands Biological Reserves

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 28 February 1973, by executive decree 2858-A (Guayabo and Negritos) and 28 April 1976, by executive decree 5963-A (Pajaros).

GEOGRAPHICAL LOCATION: Four islands in Nicoya Gulf, northwestern Costa Rica. Guayabo is about 8km south of Puntarenas Port, Negritos (two islands) is 16.5km and Pajaros 13km northwest of Puntarenas.

ALTITUDE: Sea level to 100m.

AREA: 147 ha.

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: They are all rocky islands, most notable for their large sea bird rookeries, which have fairly difficult accessibility. There is a dry season of about six months, and the islands are largely protected from the extremes of weather and ocean within the Nicoya Gulf.

VEGETATION: Tropical dry forest (moist province transition) with the original forest very disturbed or destroyed; however, they still have some trees such as coconut *Cocos nucifera*, *Ficus* sp., *Bombacopsis quinatum*, *Spondias mombin*, *Cedreka mexicana*, *Sterculia apetala* and *Tabebuia* sp.

NOTEWORTHY FAUNA: Marine birds such as the brown pelican *Pelecanus occidentalis*, magnificent frigatebird *Fregata magnificens*, brown booby *Sula leucogaster* and anhinga *Anhinga anhinga*. The western Negritos Island is surrounded by coral reefs.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: One labourer.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Cabo Blanco National Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 21 October 1963, by executive decree 10.

GEOGRAPHICAL LOCATION: The Cabo Blanco Reserve is at the southernmost tip of the Nicoya Peninsula on the Pacific coast of the province of Puntarenas, and includes the island of Cabo Blanco; 9°31'-36'N, 85°3'-12'W.

ALTITUDE: Sea level to 355m.

AREA: 1,172 ha.

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: The rugged terrain of the reserve, bounded by the Pacific Ocean, is mainly formed of sedimentary limestone bedrock of Miocene origin. The island of Cabo Blanco, which gave its name to the reserve, is about 1.6km south of the peninsula and about 1,000 ha in area. In the dry season its rocks turn white from guano. The beaches are mainly rocky, and there are many caves. The climate is tropical humid, but with a distinct dry season between December and March. Rainfall is estimated at 2,500mm a year and the mean annual temperature is about 26°C-27°C.

VEGETATION: The original vegetation consists of about 80% lowland seasonal forest, 20% drought-deciduous tropical lowland forest. Of this forest cover only 15% is primary and 20% secondary, the remaining 65% being at various stages of earlier successional growth (1962). Among the dominant tree species are *Calycophyllum candidissimum*, the Sapodilla plum *Achras zapota* (used for making a gum), logwood *Haematoxylon campechianum*, pochote *Bombacopsis quinatum*, capulen *Muntingia calabura*, cow tree *Brosimum costaricanum* and *Tabebuia pentephylla*. There are many species of epiphytic tree orchids and bromeliads.

NOTEWORTHY FAUNA: Mammals include the howler monkey *Alouatta villosa*, paca *Agouti paca*, spotted agouti *Dasyprocta punctata* and variegated squirrel *Sciurus variegatoides*. Threatened species reported are Baird's tapir *Tapirus bairdii* (V) and jaguar *Panthera onca* (V). There are also records of two other monkeys, a local race of spider monkey *Ateles geoffroyi frontatus* (V) and the white-throated capuchin *Cebus capuchinus*, and four cats, the margay *Felis wiedii* (V), jaguarondi *F. yaguarondi* (I), ocelot *F. pardalis* (V) and puma *F. concolor*, but all still need scientific confirmation. There are large breeding colonies of frigate birds *Fregata magnificens* and pelicans, probably well over 1,000 in number.

ZONING: None, the whole area being a strict nature reserve.

DISTURBANCES OR DEFICIENCIES: None reported at present, but widespread evidence of shifting agriculture in the past.

SCIENTIFIC RESEARCH: No special programme yet begun.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Albertin, W. *et al* (1962). The Southern Tip of the Nicoya Peninsula in Costa Rica. Turrialba, Costa Rica. Inter-American Institute of Agricultural Sciences.

Wagner, P.L. (1958). Nicoya: A cultural geography. Berkley, California: University of California Press.

STAFF: A superintendent and 3 guards.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: José Abel Barroso, Superintendent, Reserva Nacional Cabo Blanco, Servicio de Parques Nacionales, Ministerio de Agricultura y Ganadería, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Rafael Lucas Rodriguez Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 30 April 1978, by executive decree 8492-A (as Palo Verde Refuge) renamed 1 October 1979.

GEOGRAPHICAL LOCATION: Near the mouth of the Tempisque River, Guanacaste province; 10°20'N, 84°22'W.

ALTITUDE: 3-230m.

AREA: 7,000 ha. Contiguous with the 9,647 ha Palo Verde National Park.

LAND TENURE: Government expropriated land by law.

PHYSICAL FEATURES: A large chain of medium-size lagoons (many of them cut-off river meanders) which form a single body of water during the rainy season because of the flooding of the Tempisque River. The annual temperature is 27°C and annual rainfall is 1,300-1,500mm, with a dry season of six months (December-April). Strong winds occur during the dry season.

VEGETATION: Characteristic vegetation includes *Andira*, *Astronium*, *Apeiba*, *Achras*, *Albizzia*, *Brosimum*, *Bombacopsis*, *Cordia*, *Couepia*, *Calycophyllum*, *Chlorophora*, *Cedrela*, *Dalbergia*, *Enterolobium*, *Ficus*, *Genipa*, *Luehea*, *Pithecelobium*, *Platymiscium*, *Nectandiz*, *Sweetia*, *Swietenia*, *Samanea*, *Inga*, *Hymenaea* and *Acacia*. *Parkinsonia aculeata*, a short tree, is abundant in some of the flooded areas. The site is located in the tropical dry forest life zone (Holdridge).

NOTEWORTHY FAUNA: This site is of vital importance in the pan-American migration route. Many waterfowl species visit this lagoon, principally during the rainy season. The species characteristic of this area include: the jabiru *Jabiru mycteria*, wood stork *Mycteria americana*, roseate spoonbill *Platalea ajaja*, white ibis *Eudocimus albus*, bare-throated tiger-heron *Tigrisoma mexicanus*, white-faced tree duck *Dendrocygna viduata*, black-bellied tree duck *Dendrocygna autumnalis*, blue-winged teal *Anas discors* and the northern shoveler *Anas clypeata*. Other noteworthy animal species present in the area are the American crocodile *Crocodylus acutus* and several mammals including howler monkey *Alouatta villosa*, spider monkey *Ateles geoffroyi*, opossum *Didelphis marsupialis*, red squirrel *Sciurus variegatoides*, coyote *Canis latrans* and white-tailed deer *Odocoileus virginianus*. A number of cat species have also been recorded.

ZONING: A master plan for management and development has recently been finished. It establishes six

use zones with the scientific or primitive zone being the largest, covering nearly 90% of the refuge.

DISTURBANCES OR DEFICIENCIES: For many years the area has been used as a cattle ranch, and the cattle have invaded and disturbed some patches of forest. Illegal hunting and poaching have been and still are being practised. During the rainy season (May-November) surface transportation is not feasible, but the refuge can be reached by aeroplane utilizing a short airstrip adjacent to the field station, or by boat from Bolson through the Tempisque River. Rice, sugar and cotton are all grown in the surrounding countryside, and problems are expected from the associated pesticide input.

SCIENTIFIC RESEARCH: Several researchers and biology students associated with the Organization for Tropical Studies, with headquarters in Costa Rica, have published papers on forest ecology, biology of different species of mammals, birds, reptiles and insects, after field studies carried out in this area.

SPECIAL SCIENTIFIC FACILITIES: This is a field station constructed by the Organization for Tropical Studies with some facilities (laboratory, kitchen, dormitories, electricity, water, etc.).

PRINCIPAL REFERENCE MATERIAL: MAG-UNA-CATIE (1981). Plan de Manejo y Desarrollo del Refugio Nacional de Fauna Rafael Lucas Rodriguez, 150 pp.

Organizaton for Tropical Studies (1971). The Book, OTS. San José, Costa Rica, 350 pp.

STAFF: A superintendent, 3 guards and 6 labourers.

BUDGET: See country sheet.

LOCAL PARK OR RESERVE ADMINISTRATION: Guillermo Canessa, Superintendent, Departamento de Vida Silvestre, Direccion General Foresta, MAG, San José, Costa Rica.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

CUBA

AREA: 114,524 sq km.

POPULATION: 9,464,000 (1976).

PARKS AND RESERVES LEGISLATION: No information.

PARKS AND RESERVES ADMINISTRATION: No information.

ADDRESS: Unknown

TOTAL AREA UNDER PROTECTION: 24,305 ha.

PROTECTED AREAS:

National Reserves	(hectares)
1 Cupeyal	10,260
2 El Cabo	7,535
3 Jaguani	4,932
4 Cabo Corrientes	1,578

DOMINICA

AREA: 751 sq km.

POPULATION: 77,083 (1978).

PARKS AND RESERVES LEGISLATION: The National Parks and Protected Areas Act No. 16 of July 1975 provides the legal basis for a park system. Cabrits is at present partially protected under the Forestry Law.

PARKS AND RESERVES ADMINISTRATION: The above act makes provision for a National Park Service to administer and manage the National Park System. However, the Forestry Division continues to shoulder responsibilities until the Park Service can be financed.

ADDRESS: Forestry Division, Botanical Gardens, Roseau, Dominica.

TOTAL AREA UNDER PROTECTION: 6,840 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Morne Trois Pitons	6,840
2 Cabrits (proposed)	Unknown
Forest Reserve	
1 Norte	22,000



(1) Morne Trois Pitons National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 14 August 1975, by act of legislature.

GEOGRAPHICAL LOCATION: 8 miles east of Roseau, South Central Dominica; 15°20'N, 61°20'W.

ALTITUDE: 500-1220m.

AREA: 6,840 ha. An extension to the park - the Archbold Preserve (396 ha) - is held in trust by the US Nature Conservancy, and will be included in the park at a later date.

LAND TENURE: Over 99% is publicly owned.

PHYSICAL FEATURES: Basaltic spike-like remains of a former volcano rising to approximately 1,400m, within 8km of the sea. The area is of Miocene origin, and is characterised by precipitous slopes and deeply incised valleys. It contains many fumaroles, hot springs, mud pots, sulphur vents and the world's second largest boiling lake. Rainfall is 7620mm per annum at the summit of the park, 6310mm in the foothills.

VEGETATION: 10% of the park is composed of elfin woodland at the tops of the mountains, in an area which is constantly in mist and very windy. There are many ferns, mosses and lichens on the stunted trees; 45% montane formation with tall spindly trees with small crowns. Variations occur, depending on topography, but the commonest tree is probably the 'Resinier montagne' *Podocarpus coriaceus*; 15% rainforest below 790m with very luxuriant growth (mainly on the foothills); and 30% secondary forest in areas which were once cleared. *Cyathea arborea* and *Miconia guianensis* are common in the succession. This is the largest area of unaltered cloud, rain and moist forest in the Lesser Antilles.

NOTEWORTHY FAUNA: The siffleur montagne or Dominican mountain bird *Myadestes genibarbis*, Sisserou parrot *Amazona imperialis* and red-necked parrot *Amazona arausiaca* are present.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: One small inholding in the Freshwater Lake area; a water diversion channel at Freshwater Lake.

SCIENTIFIC RESEARCH: Research has been undertaken on geothermal potential and on the flora and fauna of the park.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Honychurch, P.N. (1978). Brochures on different facets of the park (Concept and Purpose, Geology and Soils, Wildlife, Vegetation and Water). Dominica National Park Service.

Thorsell, J.W. and Wood, George (1976). Dominica's Morne Trois Pitons National Park. *Nature Canada* 5(4).

STAFF: 2 technicians, a ranger and a guard full-time; a ranger and 3 guards part-time; 8 occasional labourers.

BUDGET: US \$ 80,000.

LOCAL PARK OR RESERVE ADMINISTRATION: While the Park Service is being formed and financed, the Forestry Division continues to hold responsibility for the park. Dominica National Park Office, Victoria Street, PO Box 149, Roseau, Dominica.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 9 March 1979.

DOMINICAN REPUBLIC

AREA: 48,441 sq km.

POPULATION: 5,124,000 (1978).

PARKS AND RESERVES LEGISLATION: Law #4389 (19 February 1956), Law #5066 (24 December 1958), Law #409 (26 May 1976), Law #644 (14 May 1974), and Law #1311 (16 September 1975) are the laws establishing the individual parks. Law 67 of 20 November 1974 created the Direccion Nacional de Parques.

PARKS AND RESERVES ADMINISTRATION: The Direccion Nacional de Parques, which reports directly to the President's Office, has as its principal objective the conservation, in a pristine condition of representative samples of existing ecosystems in the country for the use of these resources to benefit present and future generations.

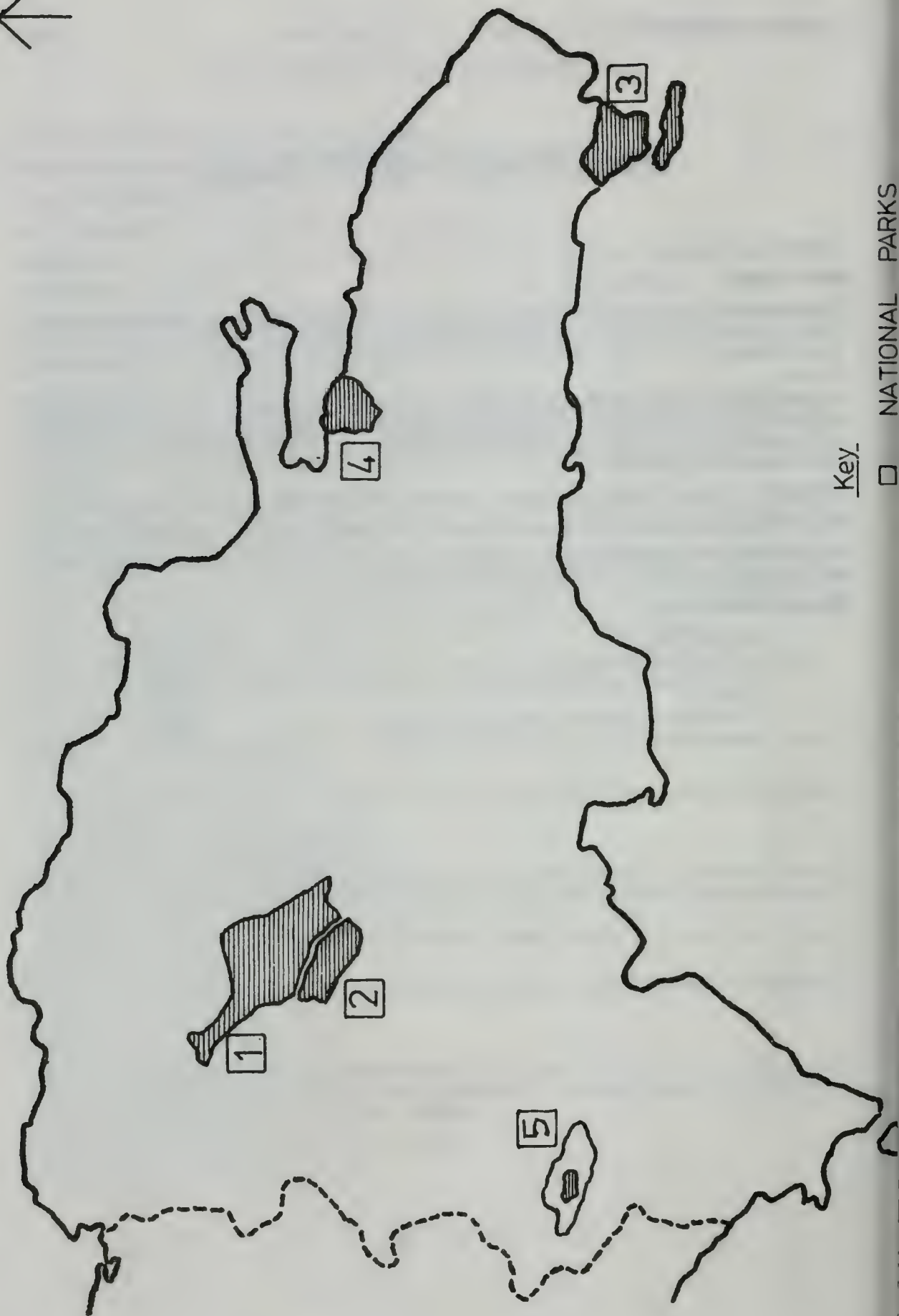
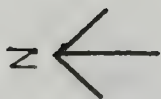
ADDRESS: Direccion Nacional de Parques, Apartado 2487, Santo Domingo, Dominican Republic.

REFERENCES: Parques Nacionales en la Republica Dominicana. Direccion Nacional de Parques.

TOTAL AREA UNDER PROTECTION: 219,800 ha. (though this may be decreased to only 211,800 ha with the reduction in size of the Los Haitises National Park).

PROTECTED AREAS:

National Parks	(hectares)
1 Armando Bermudez	76,600
2 José del Carmen Ramirez	76,400
3 del Este	43,400
4 Los Haitises (Boundary and size change likely)	20,800
5 Isla Cabritos	2,600



Key

□ NATIONAL PARKS

(1) Armando Bermudez National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 19 February 1956, by Law #4389.

GEOGRAPHICAL LOCATION: The northern slopes of the Cordillera Central, in the provinces of La Vega, Santiago and Valverde, 170 km northwest of Santo Domingo; 19°05'N, 71°00'W.

ALTITUDE: 500-3,087m.

AREA: 76,600 ha, contiguous with the J. del Carmen Ramirez National Park of 76,400 ha.

LAND TENURE: Federal Government.

PHYSICAL FEATURES: The rugged northern slope of the Cordillera Central includes Duarte Peak, the highest point in the Caribbean, and the major watersheds of the northern part of the country.

VEGETATION: Subtropical wet, montane and lower montane forest. The lower elevations are characterized by broadleaved hardwoods, while pines *Pinus occidentalis* are characteristic of higher elevations.

NOTEWORTHY FAUNA: Haitian solenodon *Solenodon paradoxus* (E) - a small insectivore, the Hispaniolan parrot *Amazona ventralis*, Hispaniolan parakeet *Aratinga chloroptera*, Hispaniolan trogon *Temnotrogon roseigaster*, plain pigeon *Columba inornata*, ground warbler *Microligea palustris* and several reptiles. All the above are endemic to the island except the plain pigeon, which is also found in Cuba and Jamaica.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Past agricultural incursions along some park boundaries.

SCIENTIFIC RESEARCH: - None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 21.

BUDGET: RD\$ 48,400.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Nacional de Parques, Apartado 2487, Santo Domingo, Dominican Republic.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 25 November 1980.

(2) José del Carmen Ramirez National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 December 1958, by Law #5066.

GEOGRAPHICAL LOCATION: On the southern slopes of the Cordillera Central, in the provinces of San Juan de la Maguana, Azua and La Vega, 180km northwest of Santo Domingo; 19°00'N, 71°00'W.

ALTITUDE: 700-3,087m.

AREA: 76,400 ha, contiguous with the Armando Bermudez National Park of 76,600 ha.

LAND TENURE: Federal Government.

PHYSICAL FEATURES: The southern slopes of the Cordillera Central are the source of several major watersheds, and includes part of Pico Duarte, the highest mountain in the Antilles.

VEGETATION: Lower montane moist, wet and rain forest, montane wet forest including stands of western pine *Pinus occidentalis*, broadleaf forests and moist savannahs.

NOTEWORTHY FAUNA: Endemic Haitian solenodon *Solenodon paradoxus* (E), Hispaniolan parrot *Amazona ventralis*, Hispaniolan parakeet *Aratinga chloroptera*, Hispaniolan trogon *Temnotrogon roseigaster*, golden swallow *Kalochelidon euchrysea*, plain pigeon *Columba inornata*, ground warbler *Microligea palustris* and several reptiles.

ZONING: Wilderness area for the present.

DISTURBANCES OR DEFICIENCIES: Past agricultural incursions along some park boundaries.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 19.

BUDGET: RD\$ 48,080.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 25 November 1980.

(3) del Este National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 16 September 1975 by law #1311.

GEOGRAPHICAL LOCATION: Southern Dominican Republic, in the province of Altagracia, including the peninsula to the southeast of La Romana and the island of Saona; 18°15'N, 68°45'W.

ALTITUDE: Sea level to 50m.

AREA: 43,400 ha.

LAND TENURE: Federal Government ownership.

PHYSICAL FEATURES: Low coastal limestone substrate including several cave systems of anthropological importance. The park includes the offshore island of Saona, which is also flat except for the northeast coast which has cliffs.

VEGETATION: Subtropical dry forest, subtropical moist forest and transition forest are the life zones as defined by Holdridge. Trees found in the park include the mahogany *Swietenia mahogani*. There are coastal mangroves, particularly in the south on the mainland, with the four mangrove species common in the Caribbean, *Rhizophora mangle*, *Conocarpus erectus*, *Laguncularia racemosa* and *Avicennia germinans*. There are also beaches with coconut palms *Cocos nucifera*.

NOTEWORTHY FAUNA: Endemic solenodon *Solenodon paradoxus* (E), Hispaniolan hutia *Plagiodontia aedium* (I), Hispaniolan parrot *Amazona ventralis*, great lizard cuckoo *Saurothera merlini*, Hispaniolan woodpecker *Melanerpes striatus*, broad-billed tody *Todus subulatus*, flat-billed vireo *Vireo*

nanus, striped-headed tanager *Spindalis zena* and iguana *Cyclura cornuta*. This is a major nesting site for white crowned pigeon *Columba leucocephala*. The manatee *Trichechus manatus* (V) also occurs occasionally off the coast, and leatherback turtles *Dermochelys coriacea* (E) nest on the park beach. There are also several species of coral in the park.

ZONING: The master plan designates strict natural zones, managed natural zones, wilderness zones, protected anthropological zones and tourist/administrative zones.

DISTURBANCES OR DEFICIENCIES: The adjacent marine area is not yet protected. Depletion of lobster and conch by overfishing; hunting of manatee. Slash and burn cultivation.

SCIENTIFIC RESEARCH: Study of reptiles on Saona Island; studies of native and migratory birds in the park.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Plan de Manejo del Parque Nacional del Este. Dirreccion de Nacional Parques.

STAFF: 15.

BUDGET: RD\$ 45,078.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Nacional de Parques, Boca de Yuma, Provincia Altagarcia, Dominican Republic.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 25 November 1980.

(4) Los Haitises National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 26 May 1976, by Law #409.

GEOGRAPHICAL LOCATION: At the southwest end of the Bay of Samana, in the provinces of Duarte and El Seibo; 19°00'N, 69°30'W.

ALTITUDE: Sea level to 227m.

AREA: 20,800 ha (likely to be decreased).

LAND TENURE: Federal Government.

PHYSICAL FEATURES: Unique karstic formation of many abrupt hills including coastal limestone caves.

VEGETATION: Subtropical moist and wet forests.

NOTEWORTHY FAUNA: Include the endemic solenodon *Solenodon paradoxus* (E) and hutia *Plagiodontia aedium* (I), red-tailed hawk *Buteo jamaicensis*, the endemic Hispaniolan parrot *Amazona ventralis* and Hispaniolan woodpecker *Melanerpes striatus*, and the great lizard cuckoo *Saurothera merlini*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The original park is heavily disturbed by local agriculture. It is now in the final stages of a boundary change that will provide a park of 12,800 ha.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 19.

BUDGET: RD\$ 48,660.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Nacional de Parques, Apartado 2487, Santo Domingo, Dominican Republic.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 25 November 1980.

(5) Isla Cabritos National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: May 14 1974, by Law #664.

GEOGRAPHICAL LOCATION: In Lake Enriquillo, Neiba Province; 18°30'N, 71°40'W.

ALTITUDE: 46m below sea level to 20m below sea level.

AREA: 2,600 ha.

LAND TENURE: Federal Government ownership.

PHYSICAL FEATURES: The sanctuary covers the arid island of Cabritos in the hyper-saline lake of Enriquillo, between the Sierras of Neiba and Bahoruco. Unusual landforms include fossilized coral beds.

VEGETATION: Subtropical dry forest characterized by mesquite, giant milkweed and several cactus species.

NOTEWORTHY FAUNA: Breeding and resting grounds for American crocodile *Crocodylus acutus* (E), habitat for the endemic iguanas *Cyclura cornuta* and *Cyclura ricordi*, feeding and resting grounds for the flamingo *Phoenicopterus ruber* and many migratory bird species.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Diversion of water for agriculture in the surrounding hills is slowly drying out the lake. The passing of hurricanes and tropical storms sometimes replenishes the lake level for short periods.

SCIENTIFIC RESEARCH: An ongoing research project on the American crocodile in the lake is being carried out by the Dominican Museum of Natural History, funded by the World Wildlife Fund.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 8.

BUDGET: RD\$ 38,317.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion Nacional de Parques, Apartado 2487, Santo Domingo, Dominican Republic.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 25 November 1980.

ECUADOR

AREA: 455,502 sq km.

POPULATION: 8,000,000 (1979).

PARKS AND RESERVES LEGISLATION: The Law of National Parks and Reserves, Decree #1306, 27 August 1971 provides for the management of the parks system by the Forest Service in collaboration with the National Tourist Office and the General Fisheries Directorate. Charges and group sizes are fixed, and illegal acts are specified. These include carrying arms, removing plants or animals, use of sirens or radios, overflying etc. The Law on the protection of the wildlife and Ichthyological Resources, Decree #818, 17 November 1970, and Interministerial Agreement #322, 26 July 1979, are also relevant.

PARKS AND RESERVES ADMINISTRATION: Administration of the National Parks and Reserves is the responsibility of the Department of Natural Areas and Wildlife, which is part of the National Forestry Programme of the Ministry of Agriculture. National Parks are extensive areas established by executive decree where plant or animal species, habitats or geological forms are found which are of national significance for science, education, recreation and tourism. The area is permanently maintained, and exploitation or occupation prevented. Ecological reserves are areas of 10,000 hectares or more which are established by executive decree and which, similar to the parks, are of particular importance because of plant or animal species, habitats or geological formations, but which in this case are protected predominantly for education and research. Fauna Reserves are areas specifically maintained for wildlife species, and in which sport or subsistence hunting may be allowed. National Recreation Areas are primarily established for recreation and tourism.

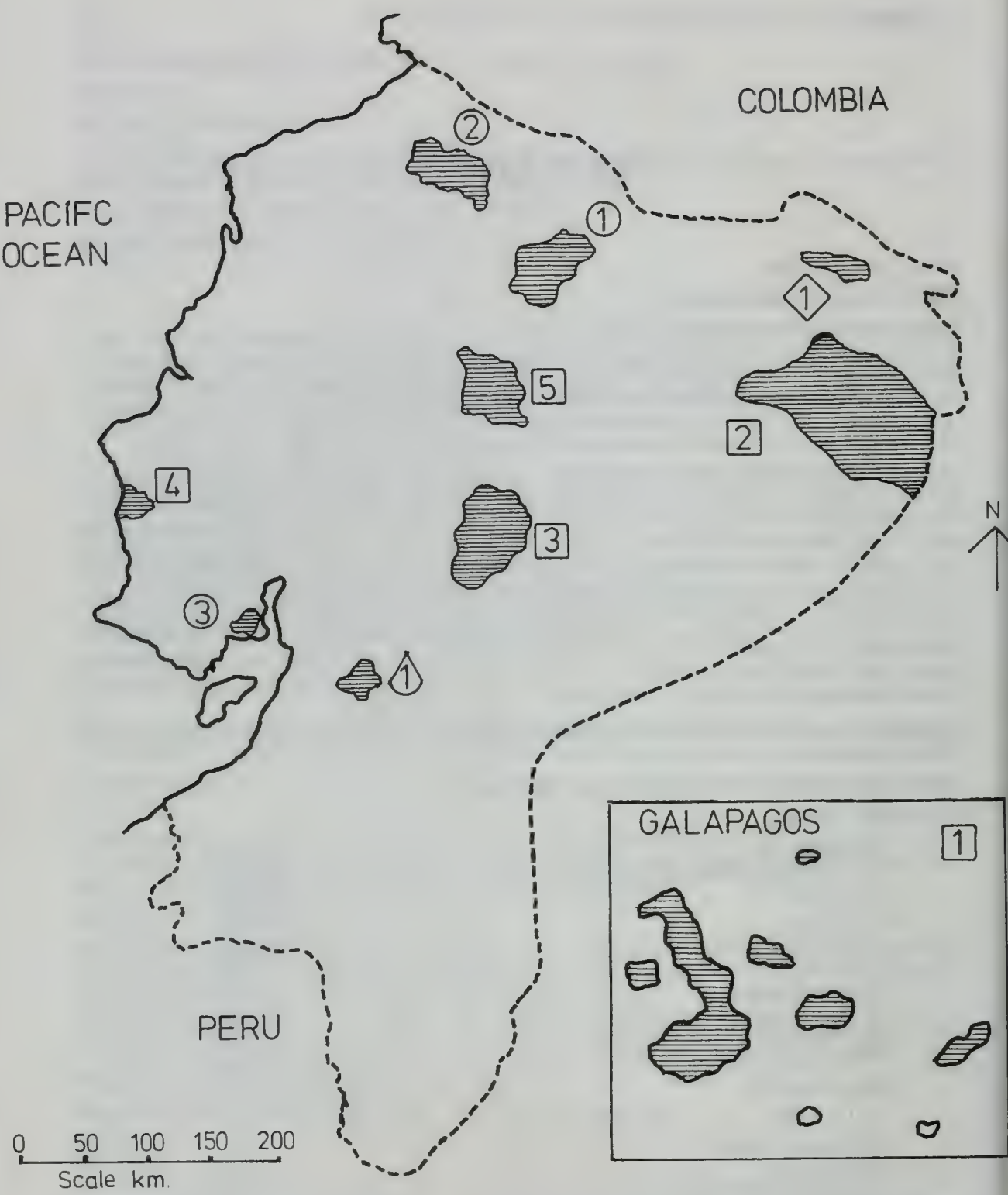
ADDRESS: Departamento de Areas Naturales y Vida Silvestre, Ministerio de Agricultura y Ganaderia, Quito - Paraguay.

TOTAL AREA UNDER PROTECTION: 1,990,200 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Galapagos (World Heritage Site)	691,200
2 Yasuni	400,000
3 Sangay	370,000
4 Machalilla	35,000
5 Cotopaxi	34,000
Ecological Reserves	
1 Cayambe-Coca	350,000
2 Cotacachi-Cayapas	45,000
3 Manglares-Churute	35,000
Faunal Reserve	
1 Cuyabeno	30,000
Geobotanical Reserve	
1 Puluahua*	2,000
National Recreation Areas	
1 Cajas*	27,000
2 El Boliche*	1,077

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.



Key.

- NATIONAL PARKS
- ECOLOGICAL RESERVES
- ◇ FAUNAL RESERVES
- △ NATIONAL RECREATIONAL AREA

(1) Galapagos

MANAGEMENT CATEGORY: II & X (National Park & World Heritage Site).

BIOGEOGRAPHICAL PROVINCE: 8.44.13 (Galapagos Islands).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Mayo 14 1936. Ratificada con Decreto No. 17, Julio 4 1959.

GEOGRAPHICAL LOCATION: 1000 km de las costas del Ecuador; aproximadamente 1°50'N - 1°30'S y 89°20'W - 91°50'W.

[After final establishment of the boundaries in 1968, 88% of the land area of the archipelago has been included in the Park].

ALTITUDE: 0-1,700 metres.

AREA: 691,200 ha.

LAND TENURE: Propiedad del estado.

PHYSICAL FEATURES: El Archipelago esta constituido de 13 islas grandes, 19 pequenas y muchos islotes y rocas. A excepcion de 2 islas del Norte, el resto se levantan de una plataforma submarina poco profunda. Las islas de mayor edad presentan aspecto bajo, plano u ondulado, con grandes acantilados. La mayoria son mas jovenes, compuestas de volcanes y conos menores, flanqueados de grandes extensiones de lava negra o cafe. En algunos lugares, de las costas, la erosion marina y las fallas ocasionaron precipicios y playas de lava, coral o arena de conchas. El paisaje incluye lagunas en crateres, fumarolas, tubos y campos de lava.

VEGETATION: Cerca de 650 especies y subspecies nativas, de las que 36 per cent son endémicas. 250 especies introducidas (mayoria en areas pobladas). En el litoral predominan manglares *Rhizophora mangle*, *Avicennia germinans*, *Laguncularia racemosa* y *Sesovium* sp. En la zona seca: cactus, especialmente *Brachycereus*, *Jasminocereus thouarsii*, *Opuntia* sp ; también *Bursera graveolens*, *Croton escouleri*. En la zona humeda, *Scalesa* sp., *Psidium galapagenium* y *Pisona floribunda*. Ademas, existe la zona de la *Miconia robinsoniana*. En las partes mas altas ciperaceos, gramineas y helechos (especialmente *Cyanthea weatherbyana*).

NOTEWORTHY FAUNA: La fauna endémica esta constituida por invertebrados, reptiles y aves; pocos mamiferos y ausencia de anfibios. Todos los reptiles, excepto 2 especies to tortuga marina son endémicas; incluyen la tortuga gigante *Geochelone elephantopus* (E) con 11 subespecies en las diferentes islas. Iguanas terrestres *Conolophus subcristatus* y *C. pallidus*, y marinas *Amblyrhynchus cristatus*; grannumero de lagartijas *Tropidurus* sp. y salamanquesas *Phyllodactylus* sp.. Las aves iuncluyen 13 especies de pinzones de Darwin *Geospiza* sp., cormoran *Nannopterum harrisi*, pinguino de Galapagos *Spheniscus meniculus*, gaviota de lava *Larus fuliginosus*, flamingos *Phoenicopterus ruber*, cucubes *Nosomimus* sp.. Mamiferos representados por 2 géneros de ratas *Oryzomys* y *Nesoruzomys*; murciélagos *Lasiurus* sp.; lobo marino *Zalophus californianus*; foca peletera *Arctocephalus australis galapagoensis*.

ZONING: El Plan de Manejo senala las siguientes: Uso Intensivo (visitantes); Uso Extensivo (con mas restricciones); Uso Especial; Primitva y Primitiva-Cientifica.

DISTURBANCES OR DEFICIENCIES: En algunas islas, producias por plantas y animales introducidos.

SCIENTIFIC RESEARCH: Permanentemente, misiones scientificas e investigadores individuales de todo el mundo realizan trabajos relacionados con la biologia y geologia del Archipiélago.

SPECIAL SCIENTIFIC FACILITIES: La Estacion Cientifica Charles Darwin, establecida en 1964 (Puerto Ayora) dispone de faccilidades para la investigacion (laboratorios, bibliotecas, vivienda, medios de transporte etc.).

PRINCIPAL REFERENCE MATERIAL: Black, Juan (1973). Galapagos Archipiélago del Ecuador.

Porter, D.E. (In Press). Galapagos Islands Red Data Bulletin.

Thorton, I. (1971). Darwin's Islands: A Natural History of the Galapagos. Natural History Press, New York.

White, A. y Epler, B. (eds.) (1972). Galapagos Guide. Imprenta Europa, Quito.

Plan Maestro para la Proteccion y Uso del Parque Nacional Galapagos. UNDP/UNESCO ECU/68/013, UNDP/FAO ECU/71/522/ Documento de Trabajo Quito, 1964.

STAFF: 1 superintendente, 3 profesionales, 6 técnicos, 55 guardaparques y 2 administrativos.

BUDGET: s/ 7,000,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Lcdo. Fausto Cepeda, Superintendente Parque Nacional Galapagos, Puerto Ayora, Isla Santa Cruz, Galapagos, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(2) Yasuni National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Acuerdo #322, Julio 26, 1979.

GEOGRAPHICAL LOCATION: Region Amazonica (Provincia del Napo); 0°26'05'-1°08'42'S y 75°25'50'-76°40'48'W.

ALTITUDE: 300-400 metres.

AREA: 400,000 ha.

LAND TENURE: 100 per cent del Estado.

PHYSICAL FEATURES: Area representativa de la region Amazonica; incluye las cuencas de los rios Yasuni y Nashino. Pequeñas elevaciones en el occidente corresponden a la formacion de terrazas fluviales del Cuaternario. Hacia el Este, el terreno es mas homogéneo y plano, con abundancia de pantanos entre los que se destacan infinidad de lagunas.

VEGETATION: No se tiene todavía un conocimiento detallado de las características de la flora en una area donde predominan el bosque húmedo y muy húmedo tropical.

NOTEWORTHY FAUNA: Estudios muy generales realizados establecen la presencia de predadores correspondientes a la cima de la piramide de consumo ecologico: jaguar *Panthera onca* (V), harpia *Harpia harpyia* (R), puma *Felis concolor*. Esto demuestra condiciones optimas de las poblaciones faunisticas.

ZONING: No estan determinadas.

DISTURBANCES OR DEFICIENCIES: No se han reportado.

SCIENTIFIC RESEARCH: Grupos o expediciones han realizado investigaciones sobre aspectos muy especificos de su flora y, principalmente, de la fauna.

SPECIAL SCIENTIFIC FACILITIES: Se ha elaborado un proyecto ara la instalacion de una estacion cientifica en esta area.

PRINCIPAL REFERENCE MATERIAL: Vreugdenhil, D. (1979). Inventario de las Areas Silvestres de la Cuenca Amazonica Ecuatoriana. Direccion de Desarrollo Forestal, UNDP/FAO ECU/71/527. Documento de Trabajo No. 29. Quito.

STAFF: 1 profesional, 1 técnico, 4 guardaparques.

BUDGET: s/ 800,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Lcdo. Flavio Coello, Intendente Parque Nacional Yasuni, Francisco de Orellana, Prov. de El Napo, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(3) Sangay National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1/8.35.12 (Amazonian/Yungas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Junio 16, 1975 Acuerdo Interministerial #0190, Ratificado con Acuerdo No. 322 de Julio 26, 1979.

GEOGRAPHICAL LOCATION: Estribaciones orientales de la Cordillera Real de los Andes; 1°27'-2°15'S y 78°03'-78°31'W.

ALTITUDE: 800-5,400 metres.

AREA: 370,000 ha.

LAND TENURE: 100 per cent del Estado.

PHYSICAL FEATURES: El area comprende los 'altos andes' (Cordillera Real) con sus montes nevados y uno volcan permanentemente activo; topografia escarpada y muchos riscos y picos rocosos. A continuacion las serranias orientales, con montana bajas junto a inmensos abanicos aluviales, cortados por los canones de los rios que rompen la cordillera y se dirigen hacia el Oriente. Por ultimo, la gran planicie Amazonica regada por infinidad de rios.

VEGETATION: La diversidad de zonas de vida permite la presencia de un amplio rango floristico. En las zonas mas altas predominan los líquenes y biofitas; mas abajo bosques homogeneos de *Polylepis* sp., *Buddleia incana*, *Miconia salicifolia*, *Myrtus communis* etc. En zonas mas bajas y humedas, *Podocarpus oleifolius*, *Alnus jurullensis*, *Cedrela odorata*, entre muchas otras especies. En el bosque muy humedo subtropical, infinidad de especies maderables, *Cordia alliodora*, *Nectandra* sp., *Ocotea* sp., *Cedrela rosei*, *Inga* sp., *Ochroma lagopus* etc.

NOTEWORTHY FAUNA: Se encuentran varias especies incluidas en el Libro Rijo de la IUCN. Danta *Tapirus pinchaque* (V) y *T. terrestris*; leopardo *Panthera onca* (V); tigrillo *Felis pardalis* (V), *F. wiedii* (V); puma *Felis concolor*; oso de anteojos *Tremarctus ornatus* (V); venado *Odocoileus virginianus*; cervicabra *Mazama rufina*; ciervo enano *Pudu mephistophiles* (I). Infinidad de aves, sobresalen gallo de la roca *Rupicola peruviana ecuatorialis*, *Ara* sp., condor *Vultur gryphus*; *Buteo* sp. etc.

ZONING: El Plande Manejo dispone las sigientes zonas: a) Uso Intensivo; b) Uso Especial; c) De Recuperacion Natural; d) Primitiva - Cientifica; e) Primitiva.

DISTURBANCES OR DEFICIENCIES: Presion por parte de los grupos colonizadores localizados en la periferie del Parque; especialmente en zonas del Sur y Sur-Oriente.

SCIENTIFIC RESEARCH: Expediciones cienticas nacionales y extranjera realizan investigaciones relacionadas con geologia y vulcanismo. Se ha comenzado a orientar la investigacion a aspectos de fauna y flora.

SPECIAL SCIENTIFIC FACILITIES: Al momento ninguna; estan proyectados para el futura inmediato.

PRINCIPAL REFERENCE MATERIAL: Macey, A. *et al* (1976). Sangay, Un Estudio de Alternativas de Manejo, Direccion de Desarrollo Forestal, World Wildlife Fund. Quito.

Schurholz, G. *et al*. (1980). Plan de Manejo del Parque Nacional Sangay. Direccion de Desarrollo Forestal, World Wildlife Fund. Quito.

STAFF: 2 superintendente, 5 técnicos, 12 guardaparques.

BUDGET: s/ 1,850,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Lcdo. Miguel Mejia, Superintendente Parque Nacional Sangay, Ministerio Agricultura y Ganaderia, Riobamba, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(4) Machalilla National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.19.4 (Ecuadorian Dry Forest).

LEGAL PROTECTION: 80 per cent.

DATE ESTABLISHED: Acuerdo Interministerial #322, Julio 26, 1979.

GEOGRAPHICAL LOCATION: Region litoral de la Prov. de Manabi; incluye las Islas de la Plata y Salango. Parte Continental; 1°21'-1°40'S y 80°38'-80°50'W.

ALTITUDE: 0-700 metres.

AREA: 35,000 ha. Incluidas Islas y 2 millas de mar a lo largo de todas las costas del Parque.

LAND TENURE: 80 per cent del Estado; el resto de particulares y colonos.

PHYSICAL FEATURES: La parte continental comprende la region costanera con extraordinarios ambientes marinos; suaves playas rodeadas de vegetacion natural y separadas por espectaculares formaciones de acantilados. En el Sur se interna hacia el continente, ascendiendo a un ramal de la Cordillera de Chongon y Colonche que contiene las ultimas muestras de bosque seco ecuatorial. La Isla de la Plata esta a 25 km de la costa y Salango a 1 km de distancia.

VEGETATION: En las zonas mas altas y humedas, la vegetacion es exuberante, con bosques siempre verdes; predominan *Cecropia* sp., *Ochroma lagopus*, *Ficus* sp., *Miroxylum balsamum*, y muchas palmaceas. En las zonas secas, cerca a las costas los bosques contienen especies maderables de gran valor: *Tabebuia chrisantha*, *Prosopis juliflora*, *Acacia macrocarpa*, *Cordia lutea*, etc. La zona de transicion, de duelos planos, presenta *Ziziphus thyriflora*, *Samanea saman*, *Ceiba pentandra* y *C. triachistandra*, *Cavanillesia* sp., etc.

NOTEWORTHY FAUNA: Las zonas mas altas constituyen refugio para la fauna; principalmente se observa: venado *Odocoileus virginianus*, *Mazama rufina*, sahino *Tayassu tajacu*, *T. albigularis*, guanta *Cuniculus paca*; armadillo *Dasypus novemcinctus*, perezoso *Bradypus tridactylus*, cuchucho *Nasua nasua*, tigrillos o gatos *Felis pardalis* (V), *F. wiedii* (V). Varios reptiles, sobresale la boa *Boa constrictor imperator* y la iguana.

ZONING: Zonificacion preliminar (se esta elaborando el Plan de Manejo): a) Primitiva; b) Primitiva-Cientifica; c) Uso Extensivo; d) Uso Intensivo; e) Uso Especial.

DISTURBANCES OR DEFICIENCIES: Sensible alteracion de los recursos flora y fauna en aquellas zonas con asentamientos humanos dentro del Parque.

SCIENTIFIC RESEARCH: Permanentes estudios arqueologicos.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Putney, A. y Villa, J. (1976). Estudios de Alternativas de Manejo, Area Circundante a Puerto Lopez y Machalilla. Direccion de Desarrollo Forestal, UNDP/FAO-ECU/71/527, Documento de Trabajo No. 27. Quito.

STAFF: 1 profesional-superintendente, 2 técnicos, 6 guardaparques.

BUDGET: s/ 1,500,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. César Proano, Intendente Parque Nacional Machalilla, Puerto Lopez, Manabi - Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(5) Cotopaxi National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.33.12 (Northern Andean).

LEGAL PROTECTION: 90 per cent.

DATE ESTABLISHED: Acuerdo #259-A, Agosto 15, 1975.

GEOGRAPHICAL LOCATION: Cordillera Real de los Andes; 0°33'22'-0°44'S y 78°34'0'W.

ALTITUDE: 3,300-6,000 metres.

AREA: 34,000 ha.

LAND TENURE: 50 per cent del Estado, 50 per cent particular.

PHYSICAL FEATURES: Comprende la zona que circunda al volcan Cotopaxi (volcan activo mas alto del mundo); con los volcanes Ruminahui y Sincholagua forma un traingulo que encierra paramos extensos que recogen aguas provenientes de los tres nevados. Toda la zona tiene condiciones geograficas extraordinarias, constituyendo un paisaje variado en el cual sobresalen una serie do morros y lomas en medio de bastas planicies.

VEGETATION: Constituida por la flora caracteristica del paramo, representado especialmente por el romerillo *Hypericum laricifolium*, *Brachyotum lepidifolium*, *Chuquiragua lancifolia*; *Polylepis incana*, *P. coriacea*; Arbustos de hojas coreaceas: pumamaqui *Oreopanax argentata*, carrasquillo *Berberis rigidifolia*, quishar o arbol de Dios *Buddleia incana*. Grandes parjonales con gramineas dominantes: *Festuca* sp., *Calamagrostis* sp., junto a las gramineas existen varias las Cyperaceas.

NOTEWORTHY FAUNA: Especies caracteristicas del paramo y algunas de zonas mas bajas que han buscado proteccion en areas protegidas. Entre los mamiferos: venado *Odocoileus virginianus*, cervicabra *Mazama rufina*, lobo *Dusicyon culpaeus reissi*, puma *Felis concolor*, zorro *Conepatus semistriatus*, conejo *Sylvilagus brasiliensis*. Entre las aves: condor *Vultur gryphus*, gaviolan *Buteo peocilochrus*, torcaza *Columba fasciata*, pato de paramo *Anas flavirostris*.

ZONING: Zonificacion provisional (se esta elaborando el Plan de Manejo) a) Zona de Uso Intensivo; b) Uso Especial; c) Recuperacion.

DISTURBANCES OR DEFICIENCIES: Actividades agropecuarias realizadas anteriormente en varias zonas del Parque han producido alteraciones en sus recursos; situacion que se ha controlado desde la declaratoria y varias areas estan en proceso de recuperacion.

SCIENTIFIC RESEARCH: Especialmente relacionada con vulcanismo. Las Universidades han comenzado ha realizar estudios en varios aspectos referentes a la biologia.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Departamento de Parques Nacionales y Vida Silvestre (1976). Parque Nacional de Altura 'Cotopaxi'. Documento Técnico de Trabajo. Quito

Lovato, A. et al. (1969). Planificacion de Un Parque Nacional en la Zona Adyacente al Volcano Cotopaxi. Tesis Ing. Agr. Universidad Central del Ecuador. Quito.

Mills, K. (1975). Flora de la Sierra; Un Estudio en el Parque Nacional Cotopaxi. *Ciencia y Naturaleza (Ecuador)* 16(1): 15-44.

STAFF: 1 profesional superintendente, 1 técnico, 8 guardaparques.

BUDGET: s/ 1,650,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Marcello Collantes, Intendente, Parque Nacional Cotopaxi, Latacunga, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(1) Cayambe-Coca Ecological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.35.12/8.5.1 (Yungas/Amazonian).

LEGAL PROTECTION: 100 per cent.

DATE ESTABLISHED: Decreto No, 818, Nov 17, 1970; Acuerdo 322, Julio 26, 1979.

GEOGRAPHICAL LOCATION: Estribaciones Orientales Cord. Real de los Andes; 0°19'42'N - 0°22'02'S; 77°22'-78°14'34'W.

ALTITUDE: 800-5,900 metres.

AREA: 350,000 ha.

LAND TENURE: 98 per cent del Estado; 2 per cent particular.

PHYSICAL FEATURES: Comprende tres zonas fisiograficas bien definidas: la Cordillera Real, una Seccion de la denominada Region Subandina del Oriente y la llanura Amazonica. El area presenta en toda su extension grandes diferencias de nivel; pendientes fuertes y abruptas entre las cuales se encuentran valles profundos y estrechos. Esta irregularidad disminuye hacia el oriente conforme se acerca la region Amazonica.

VEGETATION: Las formaciones vegetales son variadas, de acuerdo con la diversidad de zonas de vida que van desde el bosque humedo tropical a la formacion Alpina. Se pueden citar unas pocas especies principales: *Guarea* sp., *Ocotea* sp., *Dyalyanthera* sp., *Nectandra* sp., *Cedrela* sp., *Hyeronima macrocarpa*, *Eugenia* sp. En las Partes altas, la vegetacion de paramo representado por: gramineas (especialmente *Festuca*, *Stipa* y *Calamagrostis*); *Polylepis* sp., *Miconia* sp. etc.

NOTEWORTHY FAUNA: La fauna igualmente es variada y abundante. Entre los mamiferos: oso de anteojos *Tremarctos ornatus* (V), tejon *Nasua nasua*, tigrillo *Felis wiedii* (V), puma *Felis concolor*, jaguar *Panthera onca* (V), venado *Mazama americana*, *Hippocamelus antisensis* (V), zongo-zongo *Callicebus cupreus*, cariblanco *Cebus apella macrocephalus*. Aves: condor *Vultur gryphus*, gallo de la pena *Rupicola peruviana aequatorialis*, papagayo *Ara severa castaneifrons*.

[The northern huemul *Hippocamelus antisensis* (V) may not in fact be found in Ecuador according to correspondents quoted in the Mammal Red Data Book (Thornback and Jenkins, 1982)].

ZONING: El Plan de Manejo senala las siguientes: a) Intangible; b) Primitiva; c) Uso Extensivo; d) Uso Intensivo; e) Uso Especial.

DISTURBANCES OR DEFICIENCIES: Presion por parte de colonizadores localizados en la periferie.

SCIENTIFIC RESEARCH: Ha comenzado a realizarse, por parte de universidades, con referencia a la biologia. Aspectos vulcanologicos se han estudiado desde hace mucho tiempo.

SPECIAL SCIENTIFIC FACILITIES: No se disponen.

PRINCIPAL REFERENCE MATERIAL: Paucar, M. y Reinoso, G. (1978). Estudio de Alternativas de Manejo y Plan de Ordenamiento de la Reserva Ecologica Cayambe - Coca. Tesis de Grado, Universidad Central del Ecuador. Quito.

STAFF: 1 profesional-superintendente, 3 técnicos, 8 guardaparques.

BUDGET: s/ 1,900,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Gustavo Honojosa, Intendente Reserva Ecologica Cayambe - Coca, Cayambe, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(2) Cotacachi-Cayapas Ecological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: 100 per cent.

DATE ESTABLISHED: Decretos Ejecutivos 1468; 29 Ago. 1968 y #818, 17 Nov. 1970. Acuerdo #322, 26 Jul. 1979.

GEOGRAPHICAL LOCATION: Cordillera occidental de los Andes, hasta la zona litoral. 0°17'32'-0°50'45'N y 78°18'30'-78°55'58'W.

ALTITUDE: 100-4,500 metres.

AREA: 45,000 ha.

LAND TENURE: Aprox. 98 per cent del Estado; 2 per cent particular.

PHYSICAL FEATURES: El area comprende la parte alta de la Cordillera Occidental, los declives occidentales y la zona baja o litoral de la Provincia de Esmeraldas. En la primera parte sobresalen los macisos volcanicos del Cotacachi, Yanaurco y Pilabo; la parte baja acumula infinidad de rios que desembocan en el Ocean Pacifico; esta zona es de gran pluviosidad y constituye una muestra característica del Bosque Tropical. Incluye importantes lagunas en su parte alta.

VEGETATION: La flora del Area es muy variada, de acuerdo a las diversidades de zonas de vida. Se pueden citar las siguientes especies representativas: balsa *Ochroma lagopus*, cana guada *Guada augustifolia*, cuangaré *Dialyanthera* sp., chalyiande *Virola* sp., chanul *Humira procera*, guabo *Inga* sp., guayacan *Minquartia punctata*, macarey *Hieronyma chocoensis*, nato *Mora megistosperma*, tangare *Carapa guianensis*.

NOTEWORTHY FAUNA: De una gran diversidad de fauna se citan las siguientes especies: venado *Mazama americana*, tigrillo *Felis pardalis* (V), *F. wiedii* (V), jaguar *Panthera onca* (V), saino *Tayassu tajacu*. Entre los reptiles, la tortuga *Chelonia mydas* (E).

ZONING: No esta zonificada.

DISTURBANCES OR DEFICIENCIES: Asentamientos humanos en algunos sitios de la Reserva.

SCIENTIFIC RESEARCH: Esporadicamente se realiza, especialmente en la zona baja (litoral).

SPECIAL SCIENTIFIC FACILITIES: En el campamento de Borbon existe alojamiento que, eventualmente, se ha destinado a este proposito.

PRINCIPAL REFERENCE MATERIAL: Ortiz, F. (1977). Estudio de Alternativas de Manejo de la Reserva 'Cotacachi - Cayapas'. Direccion Desarrollo Forestal. Quito.

STAFF: 1 profesional intendente, 2 técnicos, 6 guardaparques.

BUDGET: s/ 1,260,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Ruth Quezada, Intendente de la Reserva Cotacachi - Cayapas, Cotacachi, Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

(3) Manglares-Churute Ecological Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.19.4 (Ecuadorian Dry Forest).

LEGAL PROTECTION: 70 per cent.

DATE ESTABLISHED: Acuerdo #322, Julio 26, 1979.

GEOGRAPHICAL LOCATION: Manglares del Golfo de Guayaquil y Cordillera de Churute. 2°19'40"-2°36'09"S y 79°34'11"-79°49'24"W.

ALTITUDE: 0-500 metres.

AREA: 35,000 ha.

LAND TENURE: 98 per cent del Estado; 2 per cent particular.

PHYSICAL FEATURES: La parte alta esta formada por una ramificacion de la Cordillera Churute, de topografia bastante irregular, con pendientes que disminuyen su intensidad al acercarse a la costa, en donde el terreno es plano con ligeras depresiones; termina en la zona de manglares, importantes por ser una de las pocas muestras de este ecosistema estuarino, sin gran alteracion.

VEGETATION: Las partes mas altas se presenta la balsa *Ochroma lagopus*, pechiche *Vitex gigantea*, laurel *Cordia alliodora*, guayacan *Tabebuia chrysantha*, balsamo *Myroxylon balsamo*. En la zona de manglares: mangle rojo *Rhizophora mangle*, mangle blanco *Leguncularia racemosa*, mangle negro *Avicennia nitida*.

NOTEWORTHY FAUNA: En la parte alta son comunes: zorro *Dedilphis marsupiales*, peresozo *Bradypus tridactylus*, venado *Odocoileus virginianus*. En la zona de transicion son comunes la iguana verde *Iguana iguana*, boa *Boa constrictor*, tortuga de poza *Chelydra serpentina*.

ZONING: No esta zonificada.

DISTURBANCES OR DEFICIENCIES: Instalacion de camaroneras en manglares cercanos a la Reserva.

SCIENTIFIC RESEARCH: No se ha generalizado.

SPECIAL SCIENTIFIC FACILITIES: No existen.

PRINCIPAL REFERENCE MATERIAL: Universidad Estatal de Guayaquil (1978). Estudio de Alternativas de Manejo del Area Manglares - Churute. Direccion de Desarrollo Forestal. Quito.

STAFF: 1 técnico encargado de la Reserva, 2 guardaparques.

BUDGET: s/ 750,000 sucres.

LOCAL PARK OR RESERVE ADMINISTRATION: Per. For. Fredy Zambrano, Intendente de la reserva Ecologica Manglares Churute - Ministerio de Agricultura y Ganaderia, Guayaquil - Ecuador.

NAME OF CNPPA COORDINATOR: A. Ponce.

INFORMATION DATED: Junio 18, 1981.

EL SALVADOR

AREA: 20,865 sq km.

POPULATION: 4,233,800 (1978).

PARKS AND RESERVES LEGISLATION: Under the Forestry Law (1973) there is one section (Chapter 5, articles 45, 46, 47 and 48) that regulates protected areas, forest reserves, national parks and equivalent reserves and provides for their establishment and management. In June 1974 a Unit of National Parks and Wildlife was established within the Forestry and Fauna Service. Ministerial Decree 236 of April 1981 created a new National Parks and Wildlife Service, and transferred all mandates included in Forestry Law about National Parks and Wildlife Management to the new service. There are no areas yet declared by law within El Salvador, although strong protective measures are already being taken in the four areas mentioned below, and in the Bosque El Imposible and Barra de Santiago (two mangrove areas).

PARKS AND RESERVES ADMINISTRATION: Within the Renewable Natural Resources Directorate there exists the National Parks and Wildlife Service which is responsible for the management of national parks and equivalent reserves. The National Institute of Tourism (INSTU) has a Department of National Parks and Recreation Centres (Turicentros); it has under its control the Cerro Verde National Park and has elaborated a master plan for Deinninger National Park. The Unidad de Parques Nacionales y Vida Silvestre does not have fixed annual budgets for each park and reserve under its administration, rather the overall budget is adjusted to meet priorities throughout the year.

ADDRESS: Francisco Serrano, Director, Servicio de Parques Nacionales y Vida Silvestre, Direccion General de Recursos Naturales Renovables, MAG, San Salvador, El Salvador.

REFERENCES: Daughtery, H.E. (1973). Conservacion ambiental en El Salvador; recomendaciones para un programa de accion nacional. M.S., 60 pp.

TOTAL AREA UNDER PROTECTION: No parks or reserves are legally established yet. Due to the recently implemented Agrarian Reform by the government the National Parks Service intends to at least triple the number of conservation units in the next few years.

PROTECTED AREAS:

National Parks	(hectares)
1 Montecristo (proposed)	1,990
2 Cerro Verde	800
3 Deinninger	200
Wildlife Sanctuary	
1 Laguna Jocotal (proposed)	1,000

(1) Montecristo National Park

MANAGEMENT CATEGORY: Proposed National Park.

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madeiran-Cordilleran).

LEGAL PROTECTION: Partial.

DATE ESTABLISHED: Under management and protected but not yet legally established.

GEOGRAPHICAL LOCATION: The park is on the international border between Guatemala and El Salvador; 14°26'N, 89°22'W.

ALTITUDE: From 1,600 to 2,418m.

AREA: 1,990 ha approximately.

LAND TENURE: The majority of the land is privately owned.

PHYSICAL FEATURES: Montecristo is the last remaining patch of virgin forest in the country. There are three main peaks: Cerro Brujo (2,140m), Cerro Miramundo (2,394m), and Cerro Redondo and Cerro Montecristo (2,418m). This area is the wettest of El Salvador with annual rainfall over 2,000mm. The daily temperature oscillates from 10°C to 15°C.

VEGETATION: There are two main forest associations. The first is the pine-oak association that goes from 1,000 to 2,100m. Today, there are only a few patches of forest of this association, the species being *Pinus oocarpa* and *Quercus* spp. Other species in this association are the sweet gum *Liquidambar styraciflua*, *Perymenium* spp., *Clethra vulcanicola*, *Nectandra sinuata* and *Cedrela mexicana*. The other is the cloud forest dominated by oaks *Quercus* spp. and several species of Lauraceae. There is a large diversity of plants, including orchids, epiphytes, lichens and ferns.

NOTEWORTHY FAUNA: The Montecristo forest is the last remaining habitat for species of wildlife that have been exterminated in the lowlands; among others the following mammal species occur in the area: the Guatemala howler monkey *Alouatta villosa* (I), brocket deer *Mazama americana*, white-lipped peccary *Tayassu pecari*. The following bird species, which are in danger of extinction, are present: quetzal *Pharomacrus moccino* (V), *Penelopina nigra* and *Dryobates villosus*. Among the species threatened in the country but still found in the area are the following mammals: spider monkey *Ateles geoffroyi* (V), Mexican tree porcupine *Coendu mexicanus*, central American cacomistle *Bassariscus sumichrasti*, spotted skunk *Spilogale putorius*, hooded skunk *Mephitis macroura*, hog-nosed skunk *Conepatus leuconatus*, puma *Felis concolor* and white-tailed deer *Odocoileus virginianus*. Among the bird species: white-faced quail dove *Geopyrtrigon linearis albifascies*, band-tailed pigeon *Columba fasciata*, barred owl *Strix varia fulvescens*, garnet throated hummingbird *Lamprolaima rhami*, green violetear *Colibri thalassimus*, collared trogon *Trogon collaris*, blue-throated motmot *Aspatha gularis*, emerald toucanet *Aula corhynchus prasinus*, Fernandina's flicker *Colaptes fernandinae mexicanoides*, mountain wren *Troglodytes solshitalis*, black-billed thrush *Turdus ignobilis*, black-throated jay *Cyanolyca pumilo* and spot-crowned woodcreeper *Lepidocolaptes affinis*.

ZONING: Not yet established.

DISTURBANCES OR DEFICIENCIES: Subsistence agriculture activities had invaded the cloud forest from 1,800 to 2,100m, eliminating much of the pine-oak forest association, prior to establishment of protection and management activities. Recovery will be slow.

SCIENTIFIC RESEARCH: A few basic studies on the avifauna and orchids.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Daughtery, H.E. (1973). Conservacion ambiental en El Salvador; recomendaciones para un programa de accion nacional. M.S., 60 pp.

STAFF: A superintendent and 8 guards.

BUDGET: This park does not have a specific budget (see country sheet).

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Manuel Benitez, Jefe Unidad de Parques Nacionales y Reservas Equivalentes, Servicio de Parques Nacionales y Vida Silvestre, DIGERENARE, MAG, Canton El Matasano, Soyapango, El Salvador.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Laguna Jocotal Wildlife Sanctuary

MANAGEMENT CATEGORY: Proposed Wildlife Sanctuary.

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: None (no legislation yet).

DATE ESTABLISHED: 1978.

GEOGRAPHICAL LOCATION: The park is located in the San Miguel Department; approximately 13°19'N, 88°15'W.

ALTITUDE: Approx. 100m.

AREA: 1,000 ha approx.

LAND TENURE: Mostly privately owned.

PHYSICAL FEATURES: A eutrophic lake located at the base of the San Miguel Volcano. The land around the lake is completely covered by an old lava flow.

VEGETATION: The life zone in the area is sub-tropical moist forest. The forest around the lake was removed many years ago, but there are still some small patches of secondary forest and a swampy area surrounds the lake completely, with some short vegetation on it. No inventory exists of the vegetation species that occur in the area. There are a few pools in the lake free of aquatic vegetation; the majority of the lake is covered by a species of grass and water hyacinth.

NOTEWORTHY FAUNA: The main objective of this refuge is the protection of local and migrating waterfowl, including fulvus tree duck *Dendyocygna bicolor*, black-bellied tree duck *D. autumnalis*, muscovy duck *Cairina moschata*, mallard *Anas platyrhynchos*, blue-winged teal *A. discors*, northern shoveler *A. clypeata*, lesser scaup *Aythya affinis*, masked duck *Oxyura dominica*, jacana *Jacana spinosa*, grey moorhen *Gallinula chloropus*, purple gallinule *Porphyryula martinica* and American coot *Fulica americana*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The major problem is that the small tributaries of the lake carry pesticides used in the surrounding cotton plantations. Living around the lake are 300 families, 120 of those living from the daily fish they catch. These fishermen are allowed to use the lake, but with some regulations specifically made for them.

SCIENTIFIC RESEARCH: Some basic studies on the waterfowl have been carried out. To increment the population of the tree duck, there was a small project to locate artificial nest cages on the trees for their use.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: A superintendent and 4 guards.

BUDGET: No specific budget.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Manuel Benitez, Jefe Unidad de Parques Nacionales y Reservas Equivalentes, Servicio de Parques Nacionales y Vida Silvestre, DIGERENARE, MAG, Canton El Matasano, Soyapango, El Salvador.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

FRENCH GUIANA

AREA: 90,000 sq km.

POPULATION: 59,000 (1977).

PARKS AND RESERVES LEGISLATION: As a 'department' of France, this territory has the same legislation as that country, namely law 60.708 of 22 July 1960, which applies to the establishment of National Parks, and the law of July 1976 (Loi sur la protection de la nature) which applies to all aspects of conservation, including reserves.

PARKS AND RESERVES ADMINISTRATION: Direction Departementale de l'Agriculture in Cayenne, and Museum d'Histoire Naturelle in Paris.

ADDRESS: (a) Direction Departementale de l'Agriculture, Cayenne, Guyana Francaise.
(b) Museum d'Histoire Naturelle, 57 rue Cuvier 75005, Paris, France.

TOTAL AREA UNDER PROTECTION: No reserves have been legally established yet.

PROTECTED AREAS:

National Parks	(hectares)
1 Sinnamari	25,000
2 Basse Mana	35,000
3 Ilêt du Grand Conetable	4

(1) Réserve Naturelle de Sinnamari

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: None as yet.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: Central coast, close to the town and river of the same name; 5°30'N, 52°50'W.

ALTITUDE: Sea level.

AREA: 25,000 ha.

LAND TENURE: Public land.

PHYSICAL FEATURES: Coastal wetland, and mainly forming a mangrove swamp. The reserve will also include the rocky Battures Islands.

VEGETATION: Mainly mangrove forest.

NOTEWORTHY FAUNA: Scarlet ibis *Eudocimus ruber* within the mangroves, and many sea birds on the islands.

ZONING: Most of the reserve is strictly protected, but it includes one small area which is open to visitors.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Report on Fauna of French Guiana presented by the ORSTOM (Office de la Recherche Scientifique et Technique d'Outre Mer), Cayenne.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Report on Fauna by ORSTOM.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: No information.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1979.

(2) Réserve Naturelle de Basse Mana

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: None as yet.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: On the northwest coast, above the lower Mana River and up to its mouth at Maroni; 5°45'N, 53°40'W.

ALTITUDE: Sea level.

AREA: 35,000 ha approximately (though OAS 1979 give a proposed area of 90,000 ha).

LAND TENURE: Public land.

PHYSICAL FEATURES: Coastal wetland. The area is flat and low with a hot humid climate and 1,500mm of precipitation per year. There are salt and freshwater swamps and many streams. There is firm land on the Quaternary marine sediments.

VEGETATION: Mostly 'wet savannahs' (Cyperaceae), with marshes, swamp forest, and some mangrove swamps. There are some areas of mesophytic forest.

NOTEWORTHY FAUNA: 6,000 laying leatherback turtles *Dermochelys coriacea* (E) were spotted in 1977. Birds include flamingoes (Phoenicopteridae), herons (Ardeidae) and Anatidae.

ZONING: Most of the area (approx. 30,000 ha) will be protected, except for an artificial channel built in 1973 for shrimp breeding, where tours will be organized.

DISTURBANCES OR DEFICIENCIES: Traditional hunting would be allowed over all but 2,000 ha of the reserve. There is some risk of disturbance from an agricultural project (rice). Natural sea erosion is lowering the turtle-nesting areas creating dangers from flooding, and consequent death of the eggs.

SCIENTIFIC RESEARCH: ORSTOM (Office de la Recherche Scientifique et Technique d'Outre Mer, Cayenne): Fauna of French Guiana. Also Museum d'Histoire Naturelle, Paris, especially on turtles.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See ORSTOM and Museum d'Histoire Naturelle.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: No information.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1979.

(3) Îlet du Grand Conetable

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: None as yet.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: Offshore island, situated off the extreme northeastern coast.

ALTITUDE: Sea level.

AREA: 4 ha.

LAND TENURE: Public land.

PHYSICAL FEATURES: Rocky islands.

VEGETATION: Scarce.

NOTEWORTHY FAUNA: Large numbers of seabirds, including frigate birds *Fregata* spp.

ZONING: Sanctuary.

DISTURBANCES OR DEFICIENCIES: It is hoped that the proposed legislation will prevent disturbances caused by photographers.

SCIENTIFIC RESEARCH: ORSTOM (Office de la Recherche Scientifique et Technique d'Outre Mer), Cayenne.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: ORSTOM.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: No information.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1979.

GRENADA

AREA: 344 sq km.

POPULATION: 106,406 (1978).

PARKS AND RESERVES LEGISLATION: Forest, Soil and Water Conservation Ordinance, Chapter 129 of 1 August 1949.

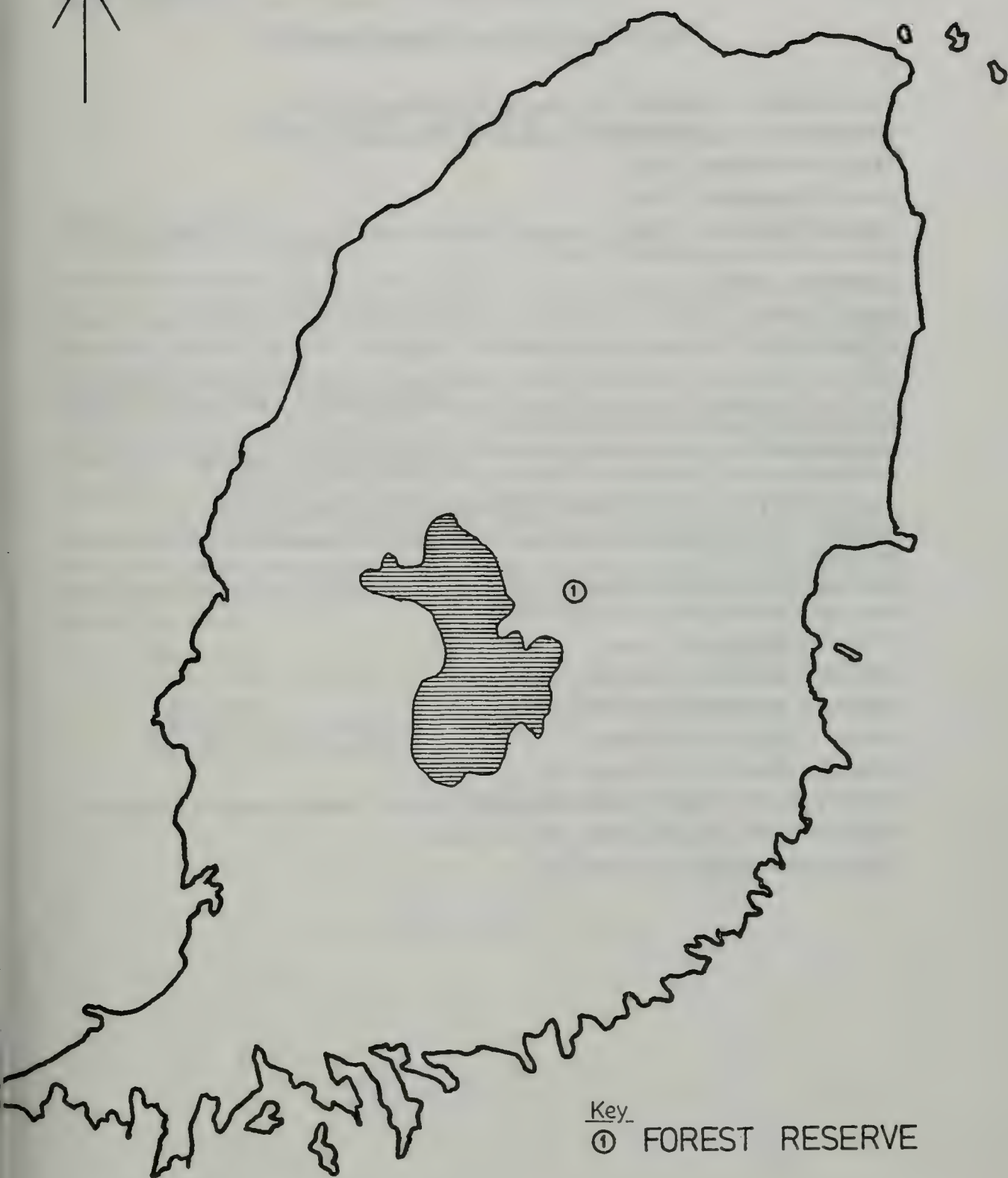
PARKS AND RESERVES ADMINISTRATION: The Forestry Division of the Ministry of Agriculture.

ADDRESS: Botanical Gardens, St Georges, Grenada.

TOTAL AREA UNDER PROTECTION: The only conservation area about which we have information is a Multiple Use Management Area.

PROTECTED AREAS:

Forest Reserve	(hectares)
1 Grand Etang	1,544



Key

① FOREST RESERVE

0 1 2 3
Scale Miles

(1) Grand Etang Forest Reserve

MANAGEMENT CATEGORY: VIII (Multiple Use Management Area).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1910.

GEOGRAPHICAL LOCATION: Mountains in the south central portion of the island, about 7km northeast of St Georges; 26°06'N, 61°42'W.

ALTITUDE: 300-765m.

AREA: 1,544 ha.

LAND TENURE: Wholly government owned.

PHYSICAL FEATURES: Steep mountainous terrain of volcanic origin, including two major peaks and the 15 ha Grand Etang Crater Lake. The area was severely damaged by a hurricane in 1955, causing numerous landslips and blowdown of vegetation.

VEGETATION: Palm brake at the higher elevations, montane and lower mountain rainforest at the mid and lower elevations. Landslide areas covered over with ferns and *Cecropia* spp.

NOTEWORTHY FAUNA: The introduced mona monkey *Ceropithecus mona*.

ZONING: The northern 35% of the reserve is zoned for strict protection while the remainder is zoned for multiple use forestry.

DISTURBANCES OR DEFICIENCIES: Many of the worst damaged areas of the 1955 hurricane have been reforested, most of these by exotic species.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: 7 rangers and 55 labourers.

BUDGET: About US\$ 10,000 during 1979.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 12 March 1979.

GUADELOUPE (France)

AREA: 1,799 sq km.

POPULATION: 317,000 (1978).

PARKS AND RESERVES LEGISLATION: As a 'department' of France, this territory has the same legislation as that country, namely Law 60.708 of 22 July 1960, which applies to the establishment of National Parks, and the law of July 1976 (Loi sur la protection de la nature) which applies to all aspects of conservation, including reserves. The proposed Guadeloupe National Park is currently protected as a Nature Park.

PARKS AND RESERVES ADMINISTRATION: Parks and reserves are under the control of the French Ministère de la Qualité de la Vie, Direction de la Protection de la Nature. In Guadeloupe, the Office National des Forêts, Mission d'Etudes pour la Creation du Parc Naturel de la Guadeloupe is also responsible for parks and reserve administration.

ADDRESS: (a) Office National des Forêts, Jardin Botanique, Basse-Terre, Guadeloupe.
(b) Ministère de la Qualité de la Vie, Direction de la Protection de la Nature, Service des Parcs et Reserves, 13 Boulevard du General Leclerc, 92521 Neuilly-sur-Seine, France.

TOTAL AREA UNDER PROTECTION: There are about 16,800 ha of Nature Park on Basse Terre in what will eventually become part of the Guadeloupe National Park.

PROTECTED AREAS:

National Park	(hectares)
1 Guadeloupe (proposed)	21,500
Flora Reserves	
2 Crêtes de village et Beaujendre (proposed)	600
3 Pitons du Nord (proposed)	3,000



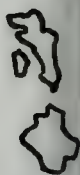
Key.  NATIONAL PARK



1



1



(1) Parc National de la Guadeloupe

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: 60% proposed.

DATE ESTABLISHED: Proposed, and expected to be established during 1982.

GEOGRAPHICAL LOCATION: Central part of the mountain of Basse Terre and a mangrove/marine area in the 'Grand Cul-de-Sac Marin', Grand Terre; 16°20'N, 61°40'W.

ALTITUDE: 0-1467m.

AREA: 21,500 ha (of which 4,700 ha are in the Grand Cul de Sac).

LAND TENURE: Public land 20,300 ha; private land 1,200 ha.

PHYSICAL FEATURES: Volcanic formation with the active volcano of Soufriere (1467m). The marine area includes coral reef formations, sea grass beds and mangrove swamp.

VEGETATION: Moist forest on higher mountains; rain forest covering most of the central part of the park. Pitons of mesophytic and xerophytic forest on slope. Mangrove (both freshwater with *Pterocarpus officinalis* and saltwater with *Rhizophora*).

NOTEWORTHY FAUNA: Raccoon *Procyon minor* and agouti *Dasyprocta molli*. Wading birds, especially *Rallus longirostris manglecola*, in the mangrove. A beetle *Dynastis herales* in the rainforest. The marine area includes mangrove, sea grass beds and reefs, and it has a concentration of the most interesting species of biotopes (cassis *Lyria archeri* are the most interesting but molluscs are threatened). This projected park also includes a nesting site for turtles, Ilêt Fazin. Three species are found in the marine section of the park: hawksbill turtle *Eretmochelys imbricata* (V), green turtle *Chelonia mydas* (E) and leatherback turtle *Dermochelys coriacea* (E) (rarely).

ZONING: Three intensive use (recreation and interpretation) areas in the central part; strict protection (no use except with authorization) in 5,000 ha of the central area and 700 ha of the marine area.

DISTURBANCES OR DEFICIENCIES: In part of the central zone of the Park (it will be extended to a maximum of 2,000 ha) there is significant pollution from agriculture, the sugar cane industry and solid waste disposal in the mangrove/sea grass bed areas.

SCIENTIFIC RESEARCH: DGRST: La Mangrove et sa Zone Cotière (The Mangrove and its Coastal Zone). Research under way. (INRA-CVAG-Museum d'Histoire naturelle de Paris). Flora: Jacques Fournet, INRA.

SPECIAL SCIENTIFIC FACILITIES: Institut National de la Recherche Agronomique (National Institute for Agronomical Research), Domaine Anclos, Petit Vourg, Station de Zoologie; and CUAG Point Familles, Pointe-a-Pitre, VER Sciences.

PRINCIPAL REFERENCE MATERIAL: Fournet, Jacques (1978). Flore des Antilles Françaises. INRA.

ONF and ADEEAR (1972). Parc Naturel de Guadeloupe. Jardin Botanique, Basse-Terre.

ONF (1977). Pour un Parc National de Guadeloupe.

STAFF: None at present.

BUDGET: None at present.

LOCAL PARK OR RESERVE ADMINISTRATION: Mission pour la création du Parc National de la Guadeloupe, Maison des Forêts, Jardin Botanique, 97.009, Basse-Terre.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1979.

GUATEMALA

AREA: 108,888 sq km.

POPULATION: 6,621,000 (1978).

PARKS AND RESERVES LEGISLATION: Article 108 of the Constitution of the Republic establishes the basis for protection of nature. Proposals exist for the establishment of a single administration under the Guatemalan Institute of National Parks and Equivalent Reserves.

PARKS AND RESERVES ADMINISTRATION: At present National Parks are administered under various agencies. The National Institute of Archaeology has the ultimate authority for Tikal National Park. The Department of National Parks and Wildlife within the National Forestry Institute (INAFOR) is by law the agency in charge of management of the National Parks, although in practice it has no activities or action applied in the field yet. The Biology School of San Carlos University owns and is managing the Quetzal Conservation Biotope near Purulha. The Guatemalan Institute of Tourism (INGUAT) has the ultimate authority for management of Rio Dulce National Park.

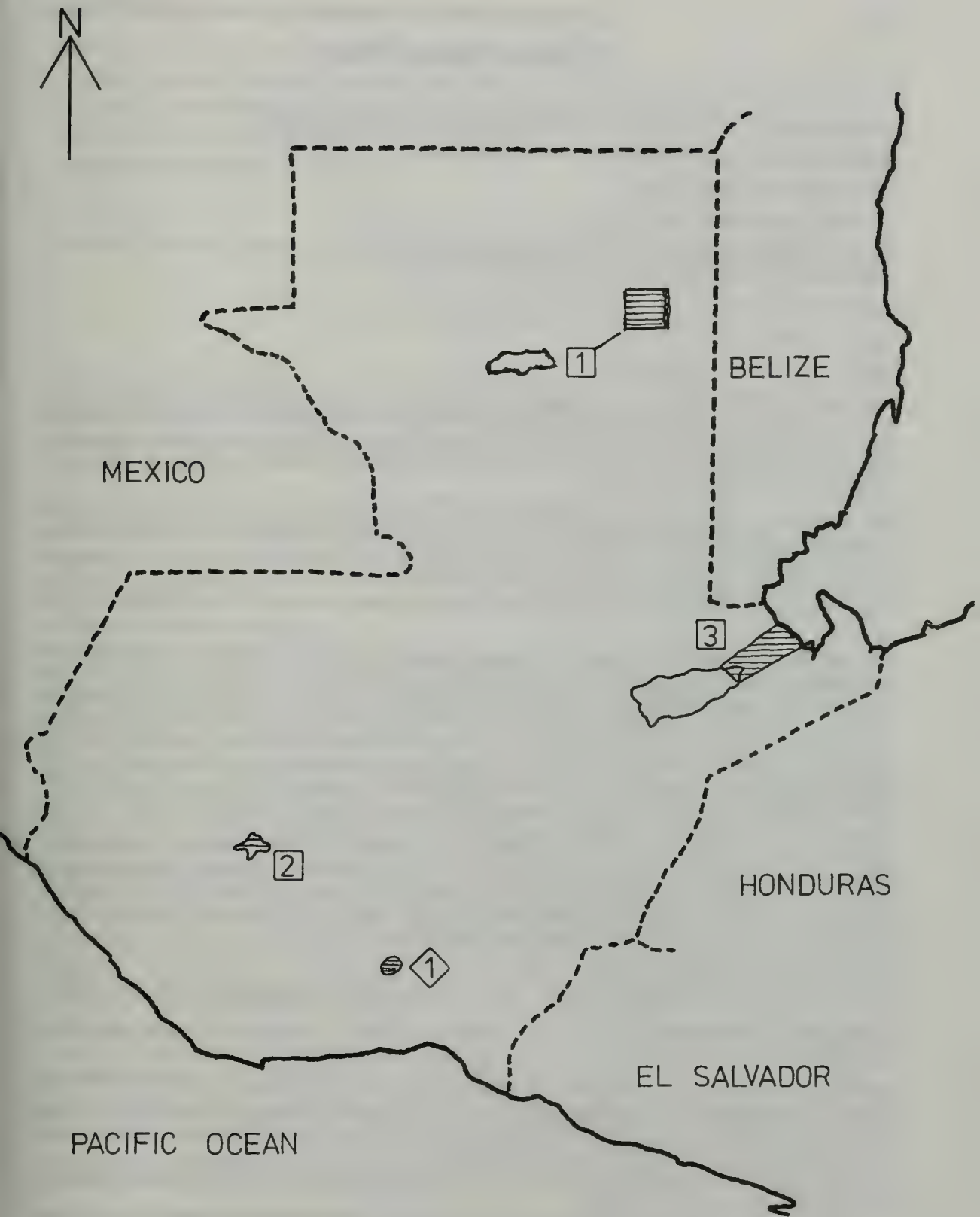
ADDRESS: (a) Instituto Nacional de Arqueologia, Guatemala City, Guatemala.
 (b) Departamento de Parques Nacionales y Vida Silvestre, Instituto Nacional Forestal (INAFOR), Guatemala City, Guatemala.
 (c) Escuela de Biologia y Farmacia, Universidad de San Carlos, Guatemala City, Guatemala.
 (d) Instituto Guatemalteco de Turismo, Guatemala.

TOTAL AREA UNDER PROTECTION: 57,600 ha.

PROTECTED AREAS:

National Parks		(hectares)
1 Tikal (World Heritage Site)		57,600
2 Lake Atitlan*		13,000
3 Rio Dulce*		24,200
4 El Rosario*		1,030
Natural Monument		
1 Pacaya Volcano*		2,000
University Biotope for Conservation of the Quetzal*		900

* These areas are not included in **TOTAL AREA UNDER PROTECTION**, the national parks and natural monument because of the disturbances in the areas concerned, the Quetzal Reserve because of its size.



Key

- NATIONAL PARKS
- ◇ NATURAL MONUMENTS

(1) Tikal National Park

MANAGEMENT CATEGORY: II (National Park & World Heritage Site).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 26 May 1955.

GEOGRAPHICAL LOCATION: Petén department, northeastern Guatemala; 17°06'45'-17°20'15'N, 89°30'35'-89°44'55'W. The ruins are at 17°13'03'N, 89°37'07'W.

ALTITUDE: 200-250m.

AREA: 57,600 ha.

LAND TENURE: Government land.

PHYSICAL FEATURES: An undulating area of Cretaceous and Caenozoic sedimentary rocks. Features include hills, lakes and a chain of swamps. The park's main attraction is the ruined city of the Maya Indians. This has temples, pyramids, houses and sculptures; large areas are still to be excavated. The climate is warm and humid with 1,500-2,000mm rainfall from September to February and in June. Annual mean temperature is 23°C.

VEGETATION: Dry tropical and subtropical forests in the transition area from wet to dry conditions. Abundant palms, epiphytes, orchids and bromeliads are present. Common tree species include cedar *Cedrela angustifolia*, West Indian mahogany *Swietenia macrophylla*, *Manilkara achras*, *Vitex guameri*, *Aspidosperma megalocarpon*, *Guarea exelsa*, bread-nut tree *Brosimum alicastrum*, *Calophyllum brasiliense*, *Cryosophila argentea*, the palm *Sabal mayarum*, *Bursera simaruba*, *Protium copal* and *Acacia farnesiana*.

NOTEWORTHY FAUNA: 54 species of mammal occur, including mantled howler monkey *Alouatta palliata nigra*, spider monkey *Ateles geoffroyi* (V), giant anteater *Myrmecophaga tridactyla* (V), lesser anteater *Tamandua tetradactyla*, dwarf anteater *Cyclopes didactylus*, three-toed sloth *Bradypus tridactylus*, nine-banded armadillo *Dasypus novemcinctus*, squirrel *Sciurus yucatanensis*, pocket gopher *Heterogeomys hispidus*, raccoon *Procyon* sp., brown coati *Nasua narica*, kinkajou *Potos flavus*, tayra *Eira barbara*, long-tailed weasel *Mustela frenata*, hooded skunk *Mephitis macroura*, otter *Lutra annectens*, puma *Felis concolor*, margay *F. wiedii* (V), ocelot *F. pardalis* (V), jaguar *Panthera onca* (V), Baird's tapir *Tapirus bairdii* (V) which is limited by water availability, collared and white-lipped peccaries *Tayassu tajacu* and *T. albirostris*, white-tailed deer, *Odocoileus virginianus* and red brocket deer, *Mazama americana sarterii*. Avifauna includes 303 species, representing 63 of the 74 families in Guatemala. Reptiles and amphibians include the threatened *Crocodylus moreletii* (E) and other crocodiles, nine families of amphibian and six genera of turtles. 38 species of non-poisonous snakes occur and poisonous snakes include coral snake *Micrurus diastema sapperi*, four species of *Bothrops* and two sub-species of rattlesnake *Crotalus*. A rich invertebrate fauna, especially arthropods.

ZONING: Not specifically defined.

DISTURBANCES OR DEFICIENCIES: Some illegal hunting and theft of archaeological remains.

SCIENTIFIC RESEARCH: Mainly on the evolution of Mayan Indian culture by the University of Florida.

SPECIAL SCIENTIFIC FACILITIES: A simple laboratory for archaeological research and a library.

PRINCIPAL REFERENCE MATERIAL: Anon (1973). Tikal National Park, Guatemala. A master plan for protection and use. United States National Parks Service, AID. (Secretaria de Planificacion Economica, Apéndice: factibilidad economica 1973).

Curley, M.A., Dary, M. and Morales, P.A.H. (1973). Inventario Preliminar de los Recursos Naturales Renovables de Guatemala. 343 pp.

Guatemala, Consejo Nacional de Planificacion Economica (1973). Tikal National Park. A master plan for protection and use. US National Parks Service. 218 pp.

Powell, D.R. (1970). A report on the development and management of the Tikal National Park. National Park Service, US Department of the Interior, Division of International Affairs. Mission to Guatemala. 218 pp.

STAFF: A superintendent, 36 technicians and 15 guards in 1973.

BUDGET: No recent information.

LOCAL PARK OR RESERVE ADMINISTRATION: Jefe Proyecto Arqueologico Tikal. Instituto Nacional de Arqueología y Historia (INAH), Guatemala City, Guatemala. C.A.

NAME OF CNPPA COORDINATOR: C. MacFarland.

INFORMATION DATED: 15 June 1981.

(2) Lake Atitlan National Park

MANAGEMENT CATEGORY: VI (Resource Reserve).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madeiran-Cordilleran).

LEGAL PROTECTION: Total. The establishment decree protects only the lake, not its shores or other surrounding land areas.

DATE ESTABLISHED: 26 May 1955, by Presidential Decree.

GEOGRAPHICAL LOCATION: Department of Solola, 70km from Guatemala City.

ALTITUDE: 1,562m.

AREA: 13,000 ha.

LAND TENURE: National land.

PHYSICAL FEATURES: The main feature is the lake itself and it is surrounded by three volcanic peaks, Pico San Pedro, Pico Toliman and Pico Atitlan. The dry season runs from November to May and the rainy season from May to November. The mean annual temperature varies from 18°C to 22°C.

VEGETATION: No information available.

NOTEWORTHY FAUNA: There is a small population of grebe *Podylimbus gigas* which is endemic to the lake and is specially protected in a small sanctuary. The quetzal *Pharomachrus mocinno* (V) is present on the higher peaks of the surrounding volcanoes, though these are not protected by the park.

ZONING: None apart from the small grebe sanctuary; no management plan exists.

DISTURBANCES OR DEFICIENCIES: The surrounding area is heavily populated by Indians as well as by mestizos. The area is a popular place for the construction of summer homes and because of the modern development the shores are becoming notably contaminated. Construction of private homes and hotels is increasing rapidly as are problems due to erosion and pollution. Several decades ago an exotic fish (bass) was introduced to the lake. There is no functioning protection. Further problems are being caused by the lowering of the lake level which is damaging the habitat of the grebe. This is thought to be a result of faulting in the underlying rocks.

SCIENTIFIC RESEARCH: Some studies have been made on the Atitlan grebe *Podylimbus gigas* and tourism development and its potential. The area badly needs a natural and cultural resources survey and management plan to be elaborated.

SPECIAL SCIENTIFIC FACILITIES: There is a rustic field station and a number of both modest and more expensive hotels in the area.

PRINCIPAL REFERENCE MATERIAL: LaBastille, A. (1974). Ecology and management of the Atitlan Grebe, Lake Atitlan, Guatemala. 66 pp.

STAFF: Three resources guards (INAFOR).

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto Nacional Forestal, Guatemala City, Guatemala.

NAME OF CNPPA COORDINATOR: C. MacFarland.

INFORMATION DATED: 15 June 1981.

(3) Rio Dulce National Park

MANAGEMENT CATEGORY: VI (Resource Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 26 May 1955 by Presidential Decree.

GEOGRAPHICAL LOCATION: Part of the lower Rio Polochio watershed, 275km from Guatemala City in Izabal Department (Livingston and Los Amantes), on the coast of eastern Guatemala; 15°30'-15°55'N, 88°40'-89°00'W.

ALTITUDE: Sea level to 1,267m.

AREA: 24,200 ha; but no exact boundaries have been fixed, and the size was only recorded as 10,000 ha by OAS (1979).

LAND TENURE: Private land. The rivershore, although government land, is settled.

PHYSICAL FEATURES: The park includes the Sierra de Mico, Lake Izabal and the mouth of the Rio Dulce on the Atlantic coast. The Rio Polochio flows through a 300-400m high canyon and elsewhere forms meanders. Geologically it is composed of serpentine, sandstones, marine sediments and alluvial deposits. Some of these rocks are rich in molluscan and other fossils. The climate is warm, tropical humid with a mean annual precipitation of 2,970mm.

VEGETATION: Humid tropical and sub-tropical rainforest and low montane wet forest. Most of the ecosystems have been altered but some virgin stands of primary forest still remain. Palms are abundant and the native pine *Pinus caribaea* is present. Other species include the mahogany *Swietenia mahogani*, cedar *Cedrela mexicana*, *Vochisia guatemalensis*, *Virola koschnyi* and *Calophyllum brasiliense*. The area around 'El Golfete' has an ecosystem unique for Guatemala.

NOTEWORTHY FAUNA: Mammals include spider monkey *Ateles geoffroyi* (V) among other monkeys, raccoon *Procyon lotor*, ocelot *Felis pardalis* (V) and jaguar *Panthera onca* (V), manatee *Trichechus manatus* (V), Baird's tapir *Tapirus bairdii* (V) and white-tailed deer *Odocoileus virginianus*. 303 species of resident birds have been recorded. The reptilian and amphibian fauna is rich, and includes *Crocodylus moreleti* (E) and *C. acutus* (E), and the terrapins *Kinosternon acutum* and *K. cruentatum*, *Chelydra rossignoni*, *Dermatemys dawii* and others. Snakes include the coral snake *Micrurus* sp., tropical moccasin or copperhead *Agkistrodon bilineatus*, fer-de-lance *Bothrops* sp. and rattlesnake *Crotalus terrificus durissus*. A rich fish fauna includes 28 families such as the Lepidosteidae, Cyprinodontidae, Cichlidae, Anguillidae and Syngnathidae.

ZONING: None; however INGUAT's (Instituto Guatemalteco de Turismo) plan can serve as a basis for re-examining the classification of the area and a more detailed management plan. According to OAS (1979) the objective of this park is to protect the Natural Monument of the same name.

DISTURBANCES OR DEFICIENCIES: Several small settlements, much deforestation and illegal hunting. There is no functioning protection and no management. Nickel mining is planned. The city of Livingston, although within the park, is not quoted as having much impact.

SCIENTIFIC RESEARCH: Studies by Florida and Oklahoma Universities of fish and insect faunas and limnology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Curley, M.A., Dary, M. and Morales, P.A.H. (1973). Inventario preliminar de los Recursos Naturales Renovables de Guatemala. 343 pp.

Guatemala, Instituto Guatemalteco de Turismo (1976). Plan Maestro para el Desarrollo Turistico del Area del Lago de Izabal y la Bahia de Amatique. Informe de Progreso. 103 pp.

STAFF: An honorary lake guard. A military patrol boat passes daily.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: INGUAT (Instituto Guatemalteco de Turismo), Guatemala City, Guatemala.

NAME OF CNPPA COORDINATOR: C. MacFarland.

INFORMATION DATED: 15 June 1981.

(4) El Rosario National Park

MANAGEMENT CATEGORY: VI (Resource Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 18 October 1980 by Presidential Decree.

GEOGRAPHICAL LOCATION: Peten Department.

ALTITUDE: Unknown.

AREA: 1,030 ha.

LAND TENURE: National land.

PHYSICAL FEATURES: No information available.

VEGETATION: No information available.

NOTEWORTHY FAUNA: No information available.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: No information available.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: No information available.

STAFF: No information available.

BUDGET: No information available.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto Nacional Forestal, Guatemala, Guatemala.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Pacaya Volcano Natural Monument

MANAGEMENT CATEGORY: III (Natural Monument) - though considering the deficiencies of the area mentioned below this category must be in doubt.

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madeiran-Cordilleran).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 20 July 1963 by Presidential Decree.

GEOGRAPHICAL LOCATION: 45km south of Guatemala City and 38km from Escuintla City; 14°20'-34'N, 90°34'-38'W.

ALTITUDE: 1,300-2,600m.

AREA: 2,000 ha approximately.

LAND TENURE: 75% of the land is privately owned.

PHYSICAL FEATURES: The Pacaya volcano is active and has several old craters with obvious lava flows. Precipitation reaches 2,000mm per year (June to September are the wettest months). The mean daily temperature ranges from 15°C to 20°C. Winds are generally northeasterly, making the southern zone the wettest area of the park, and the relative humidity averages 80%. The soils are shallow and of low to medium fertility.

VEGETATION: Broadleaf and coniferous species occur in the area. 24 genera of orchids have been recorded, these being heavily exploited in the area. The vegetation is divided into different altitudinal types: up to 1,500m the characteristic species are *Annona muricata*, *Ceiba pentandra* and *Cupressus lusitanica*; between 1,500m and 2,100m *Cedrela pacayana* (probably *tanduzii*), *Eurya theoides* and *Fraxinus hondurensis* are frequently found; above 2,100m the endemic *Quercus pacayana*, *Alnus jorullensis*, *Pinus pseudostrobus* and *P. oocarpa* are to be found in small stands on the northern and southwestern flanks of the volcano.

NOTEWORTHY FAUNA: The more common mammals are coyote *Canis latrans*, opossum *Didelphis marsupialis*, grey fox *Vulpes cinereoargenteus*, kinkajou *Potos flavus*, long-tailed weasel *Mustela frenata*, large pocket gopher *Orthogeomys grandis*, squirrels *Sciurus* spp. and eastern cottontail *Silvilagus floridanus*. Sporadically it is possible to find white-tailed deer *Odocoileus virginianus*, racoon *Procyon lotor*, southern coati *Nasua nasua*, tayra *Eira barbara*, southern spotted skunk *Spilogale angustifrons*, hooded skunk *Mephitis macroura*, margay *Felis wiedii* (V) and jaguarondi *F. yaguarondi* (I). Among the bird species are band-tailed pigeon *Columba fasciata*, ground doves *Columbina* sp., *Oreopoleia* sp., *Buteo* sp., *Falco* sp. and the owl *Ciccaba* sp.

ZONING: According to the master plan (1975) the park is divided into five zones. The primitive zone includes more than 50% of the park and is located near the main crater and the lava flows which cover the southern side of it; it also includes the forest of Cerro Grande and Cerro Chiquito. The extensive use zone covers a small area that surrounds the Laguna de Calderas and the forest along the trail to San Francisco de Sales and an area along the trail from Cerro Grande to Calderas. The intensive use zone is a relatively small and flat area, and covers a small belt along the main road between Calderas and San Francisco de Sales. The special use zone covers a small area in San Francisco de Sales village. The natural recuperation zone covers the Cerro Hoja de Queso located on the northern side of Laguna Calderas, and also covers the slopes of Cerro Chico y Cerro Grande and an area near the village of San Francisco de Sales.

DISTURBANCES OR DEFICIENCIES: The area around the volcano is inhabited by approximately 100 families, and intensive cultivation of corn takes place on the slopes, the higher parts being used for pasture. There is some shifting cultivation and migration into the area because of the poor fertility conditions of the soil. Wildlife populations have been much reduced due to hunting. Because of the deforestation the run-off on the slopes is causing heavy erosion affecting the Lago Amatitlan and other rivers of the volcano's watersheds. In the last 15 years there have been two major forest fires, both being started by volcanic activity. There is no functioning protection or management.

SCIENTIFIC RESEARCH: Some basic studies on fauna and flora have been carried out.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: FAO/INAFOR (1974). Plan de manejo para el propuesto Monumento Natural Volcan Pacaya, Guatemala. 54 pp.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto Nacional Forestal, Guatemala City, Guatemala.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

University Biotope for the Conservation of the Quetzal

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madeiran-Cordilleran).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: July 1977.

GEOGRAPHICAL LOCATION: Department of Baja Verapaz, 2km east and 2.5km south from Purulha village in the Sierra de las Minas range.

ALTITUDE: 1,580-2,348m.

AREA: Approximately 900 ha.

LAND TENURE: Owned by the University of San Carlos. 640 ha were donated to the Biology School of the San Carlos University by the Municipality of Salama, Baja Verapaz; the remainder was purchased. It is planned to increase the size of the biotope to about 3,000 ha, incorporating some national and private lands that are still covered by virgin forest, and which are contiguous to the southern and western limits of the biotope.

PHYSICAL FEATURES: The area has a very rough topography, the regular slope inclination being between 45° and 60°. There are two mountains, Cerro Quisis or Geomaya (2,348 m) and Cerro Carpintero or La Cumbre (2,011 m). The Colorado River runs through the area and has a beautiful waterfall. The average annual rainfall is approximately 3,660mm, distributed mostly from May to January.

VEGETATION: The life zone (Holdridge system) in the biotope is lower montane rainforest (cloud forest). The more common species that occur in the area are *Podocarpus oleifolius*, *Alfaroa costaricensis*, *Engelhartia* sp., *Billia hipocastanum*, *Magnolia guatemalensis*, *Brunellia* sp., *Lysiloma bahamensis*, tree-ferns of the genus *Cyathea*, *Quercus purulhana* and *Alchornea latifolia*. The dominant vegetation is broadleaf type but there are scattered small stands of two pine species, *Pinus pseudostrobus* and *P. oocarpa*. The average height of the tallest trees is over 30m.

NOTEWORTHY FAUNA: The quetzal *Pharomachrus moccino moccino* (V) is the most important bird species and the main objective of the establishment of the biotope. Approximately 60 other species of birds have been identified. At least 24 species of mammals are known from the area but only a squirrel *Sciurus griseoflavus* and the armadillo *Dasyurus novemcinctus* are abundant. 'Common' ones include howler monkeys *Alouatta* sp., another squirrel *Sciurus deppei*, Mexican porcupine *Coendu mexicanus*, weasel *Mustela frenata* and ringtail cat *Jentinkia sumichrasti*. Most other species are rare because of previous hunting in and especially around the area. Reptile, amphibian and invertebrate species are diverse and still under study.

ZONING: Provisional zoning applied: a) small administrative, visitor reception and scientific facilities area at entrance to reserve; b) interpretation zone; one 3 km nature trail; one 1 km nature trail; c) conservation zone (the majority of the reserve, only approved scientific study allowed); d) buffer zone (several metres wide fenced strip all around reserve). Detailed management and interpretative plans will have been drawn up in 1979.

DISTURBANCES OR DEFICIENCIES: None now; area well protected.

SCIENTIFIC RESEARCH: Numerous studies in past few years on reptiles, amphibians, vegetation associations, orchids, hepatics, trees etc.

SPECIAL SCIENTIFIC FACILITIES: A cabin for visiting scientists with room for 8-10, storeroom, guards' cabins, parking area, laboratory under construction and water and toilets being installed. Studies are only allowed when approved by the University of San Carlos Biology School (who require a detailed proposal).

PRINCIPAL REFERENCE MATERIAL: Dary, M. (1977). Programa de desarrollo y de investigacion para el Biotopo Universitario para la conservacion del Quetzal, Ano 1978. Univ. de San Carlos, mimeo, 83 pp.

Dary, M. and Ponciano, I. (1980). Plan de Manejo del Biotopo Universitario para la Conservacion del Quetzal, Guatemala, 175 pp (borrador mecanografiado).

Klein, E. (1979). La mastofauna superior de Biotopo Universitario para la Conservacion del Quetzal, Purulha, Baja Verapaz, Guatemala: un estudio introductorio con recomendaciones para manejo. Univ. de San Carlos y CATIE, 77 pp.

STAFF: A resident director, chief guard, 4 resources guards, 5 general guards and 8 labourers.

BUDGET: Approximately US\$ 30,000-40,000 per year (1980-81) and increasing, all from the University of San Carlos.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Mario Dary, Director, Biotopo Universitario para la Conservacion del Quetzal, Escuela de Biologia, Universidad de San Carlos, Guatemala.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

REPUBLIC OF GUYANA

AREA: 214,969 sq km.

POPULATION: 829,000 (1979).

PARKS AND RESERVES LEGISLATION: The legislation dates from 1929. Legislation establishing a National Parks Commission was enacted in February 1979. The Parks Commission becomes the authority for identifying, classifying, establishing, maintaining, and enforcing security measures in accordance with the law, and its work is to commence shortly.

PARKS AND RESERVES ADMINISTRATION: The Parks Commission of the Ministry of Energy and Natural Resources.

ADDRESS: Parks Commission, c/o Ministry of Energy and Natural Resources, Brickdam, Georgetown, Guyana.

TOTAL AREA UNDER PROTECTION: 11,655 ha.

PROTECTED AREAS:

National Park	(hectares)
1 Kaieteur	11,655



Scale Miles
0 50 100

VENEZUELA

ATLANTIC
OCEAN

1



SURINAM

Key

1

NATIONAL PARK

BRAZIL

(1) Kaieteur National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1929 as a nature reserve.

GEOGRAPHICAL LOCATION: On Pacaraima Plateau in central western Guyana; 5°00'N. 59°00'W.

ALTITUDE: 100-500 m.

AREA: 11,655 ha.

LAND TENURE: State owned lands.

PHYSICAL FEATURES: Granitic rock and sedimentary sandstone mesas, with spectacular gorges and rapids. The Kaieteur Falls of 225m are found within the park. Soils are sandy. The park is located in the west central zone with a mean temperature of 26°C and a variation of 2-3°C. Annual rainfall is 2500mm.

VEGETATION: Tropical rainforest in galleries on the banks of the main rivers Potaro, Muro Muro and Elinku. Savannahs on the mesas, and dry forests dominated by *Eperua sp.* on the sandy soil.

NOTEWORTHY FAUNA: Jaguar *Panthera onca* (V), ocelot *Felis pardalis* (V), tapir *Tapirus terrestris*, boa constrictor *Constrictor constrictor*, and a very rich bird life. The black spider monkey *Ateles paniscus* (V) is also found in the park.

ZONING: There is controlled mining of gold and diamonds around the rivers and streams. Camp sites, recreation and service areas are available. The forested area is partially accessible by trails.

DISTURBANCES OR DEFICIENCIES: Hunting and fishing by itinerant local population and small-scale mining.

SCIENTIFIC RESEARCH: Mainly on local fauna including avifauna.

SPECIAL SCIENTIFIC FACILITIES: None - to be established by the Parks Commission in conjunction with the National Science Research Council.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: A warden and 3 assistants.

BUDGET: Approximately US\$ 10,000 provided by the State (1978?).

LOCAL PARK OR RESERVE ADMINISTRATION: District Administration Offices, Ministry of Regional Development, Mahdia, Potaro.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: March 1979.

HAITI

AREA: 27,749 sq km.

POPULATION: 4,833,000 (1978).

PARKS AND RESERVES LEGISLATION: Decree of 18 March 1963 on National Parks and Natural Areas, which provides the legal basis for the establishment of protected areas and provisionally sets aside seven areas as National Parks. This law does not stipulate the administrative responsibility for the areas. The law of 3 February 1976 on National Forest Reserves is also relevant.

PARKS AND RESERVES ADMINISTRATION: This is the responsibility of the Natural Resources Division of the government department responsible for agriculture, natural resources and rural development, and also the planning department of the Institute for the Protection of the National Inheritance.

ADDRESS: (a) Departement de l'Agriculture, des Ressources Naturelles et du Developpement Rural, Division des Ressources Naturelles, Damien, Republique d'Haiti.
(b) Departement du Plan, Institut de Sauvegarde du Patrimoine National (ISPAN), Place du Champ de Mars, Port au Prince, Republique d'Haiti.

REFERENCES: Woods, Charles A. and Rosen, Richard C. (1977). Evaluation biologique d'Haiti. Statut du *Plagiodontia aedium* (I) et *Solenodon paradoxus* (V). Recommendations en ce qui concerne les preservacions naturelles et les parcs nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

TOTAL AREA UNDER PROTECTION: Only one area (La Citadelle) is firmly established in law, and this area does not meet the requirements as set out in the introduction to this volume.

PROTECTED AREAS:

National Parks	(hectares)
1 La Citadelle	250
2 La Hotte (proposed)	3,200
3 La Selle (proposed)	4,000
4 Morne Desbarrieres (proposed)	2,800
5 Morne Mansinte (proposed)	1,500
6 Morne d'Enfer (proposed)	1,500

(1) La Citadelle

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 18 March 1968.

GEOGRAPHICAL LOCATION: Mount 'Bonnet a l'Eveque', Commune de Milot; 19°36'N, 72°14'W.

ALTITUDE: Approximately 900-1,000m.

AREA: 250 ha.

LAND TENURE: Public land.

PHYSICAL FEATURES: No information.

VEGETATION: Secondary forest with a large number of introduced species. A reforestation programme is projected.

NOTEWORTHY FAUNA: No information.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: No management or control. Deforestation. Illegal hunting.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: None in the field.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Institut pour la Sauvegarde du Patrimoine National.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1980.

(2) La Hotte (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: No Information.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: Southern Peninsula, approximately 18°30'N, 74°W.

ALTITUDE: 1,000-2,347m.

AREA: 3,200 ha approximately.

LAND TENURE: Public land.

PHYSICAL FEATURES: The second highest mountain of Haiti.

VEGETATION: Mesophitic forests, tropical rainforests and pine forests (*Pinus occidentalis*). Small areas of cloud forest.

NOTEWORTHY FAUNA: Agouti *Plagiodontia aedium* (I), possibly nez longue *Solenodon paradoxus* (V), musician *Myadestes genibarbis*, calceon rouge *Temnotrogon roseigaster* and Hispaniolan parrot (jacquot) *Amazona ventralis*.

ZONING: No Information.

DISTURBANCES OR DEFICIENCIES: Deforestation, essentially for wood and charcoal.

SCIENTIFIC RESEARCH: No Information.

SPECIAL SCIENTIFIC FACILITIES: No Information.

PRINCIPAL REFERENCE MATERIAL: Woods, Charles A. and Rosen, Richard C. (1977). Evaluation biologique d'Haiti. Statut du *Plagiodontia aedium* (I) et *Solenodon paradoxus* (V). Recommendations en ce qui concerne les préservations naturelles et les Parcs Nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

STAFF: No Information.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Departement de l'Agriculture, des Ressources Naturelles et du Developpement Rural, Damien, Haiti.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1980.

(3) La Selle (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: No Information.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: 18°20'N, 72°W.

ALTITUDE: 1,600-2,674m.

AREA: Approximately 4,000 ha.

LAND TENURE: Public land.

PHYSICAL FEATURES: Calcareous relief. A large mountain range including the highest peak of Haiti. Various spectacular geological features.

VEGETATION: Cloud forest, rainforest, pine forests (*Pinus occidentalis*).

NOTEWORTHY FAUNA: Agouti *Plagiodontia aedium*(I), nez longue *Solenodon paradoxus*(V), Hispaniolan parakeet *Aratinga chloroptera*, La Selle thrush (ouete-ouete noir) *Turdus swalesi*, ground warbler (petit chitte) *Microligea palustris*, Antillean siskin (petit serin), *Carduelis dominicensis* and white-winged crossbill (bec croise) *Loxia leucoptera*.

ZONING: No Information.

DISTURBANCES OR DEFICIENCIES: Timber exploitation (pines), wood exploitation for charcoal, illegal hunting.

SCIENTIFIC RESEARCH: No Information.

SPECIAL SCIENTIFIC FACILITIES: No Information.

PRINCIPAL REFERENCE MATERIAL: Woods, Charles A. and Rosen, Richard C. (1977). Evaluation biologique d'Haiti. Statut du *Plagiodontia aedium* et *Solenodon paradoxus*. Recommenda-

tions en ce qui concerne les préservations naturelles et les parcs nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

STAFF: No Information.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Departement de l'Agriculture, des Ressources Naturelles et du Developpement Rural, Damien, Haiti.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1980.

(4) Morne Desbarrieres (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: No Information.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: Southern Peninsula, 18°25'N, 74°08'W.

ALTITUDE: 1,000-2,007m.

AREA: Approximately 2,800 ha.

LAND TENURE: Public land.

PHYSICAL FEATURES: No Information.

VEGETATION: This area contains most of the forest-types which ought to be protected in Haiti (pines, rainforest, mesophytic etc.).

NOTEWORTHY FAUNA: Agouti *Plagiodontia aedium* (I), nez longue *Solenodon paradoxus* (V), sharp-shinned hawk *Accipiter striatus* and Hispaniolan parrot (jacquot) *Amazona ventralis*.

ZONING: No Information.

DISTURBANCES OR DEFICIENCIES: Uncontrolled fires and deforestation. Illegal hunting. Wood exploitation.

SCIENTIFIC RESEARCH: No Information.

SPECIAL SCIENTIFIC FACILITIES: No Information.

PRINCIPAL REFERENCE MATERIAL: Woods, Charles A. and Rosen, Richard C. (1977). Statut du *Plagiodontia aedium* (I) et *Solenodon paradoxus* (V). Recommendations en ce qui concerne les préservations naturelles et les Parc Nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

STAFF: No Information.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Departement de l'Agriculture des Ressources Naturelles et du Developpement Rural, Damien, Haiti.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1980.

(5) Morne Mansinte (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: No Information.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: 18°22'N, 74°24'W.

ALTITUDE: 500-1,089m.

AREA: 1,500 ha.

LAND TENURE: Partly private.

PHYSICAL FEATURES: Calcareous plateau, with various forms of karstic relief.

VEGETATION: Tropical rainforest and secondary forest.

NOTEWORTHY FAUNA: Agouti *Plagiodontia aedium* (I), nez longue *Solenodon paradoxus* (V) and red-necked pigeon (ramier cou-rouge) *Columba squamosa*.

ZONING: No Information.

DISTURBANCES OR DEFICIENCIES: Numerous 'provision plots' in the lower parts of the area selected. Timber exploitation. Illegal hunting.

SCIENTIFIC RESEARCH: No Information.

SPECIAL SCIENTIFIC FACILITIES: No Information.

PRINCIPAL REFERENCE MATERIAL: Woods, Charles A. and Rosen, Richard C. (1977). Evaluation biologique d'Haiti. Statut du *Plagiodontia aedium* (I) et *Solenodon paradoxus* (V). Recommendations en ce qui concerne les préservations naturelles et les parcs nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

STAFF: No Information.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Departement de l'Agriculture, des Ressources Naturelles et du Developpement Rural, Damien, Haiti.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1980.

(6) Morne d'Enfer (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: No Information.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: 18°20'N, 72°20'W.

ALTITUDE: 1,000-1,939m.

AREA: 1,500 ha approximately.

LAND TENURE: Public land.

PHYSICAL FEATURES: Calcareous plateau, with cliffs.

VEGETATION: Tropical rainforests.

NOTEWORTHY FAUNA: Agouti *Plagiodontia aedium* (I), nez longue *Solenodon paradoxus* (V), Hispaniolan parakeet *Aratinga chloroptera*, Antillean siskin *Carduelis dominicensis*, white-winged crossbill (bec croise) *Loxia leucoptera*, sharp-shinned Hawk *Accipiter striatus* and Hispaniolan parrot (jacquot) *Amazona ventralis*.

ZONING: No Information.

DISTURBANCES OR DEFICIENCIES : Uncontrolled fires and deforestation. Illegal hunting (most of the species mentioned above are legally protected - Decree 31 March 1971 on the regulation of Hunting - but there is no control).

SCIENTIFIC RESEARCH: No Information.

SPECIAL SCIENTIFIC FACILITIES: No Information.

PRINCIPAL REFERENCE MATERIAL : Woods, Charles A. and Rosen, Richard C. (1977). Evaluation biologique d'Haiti. Statut du *Plagiodontia aedium* (I) et *Solenodon paradoxus* (V). Recommendations en ce qui concerne les préservations naturelles et les parcs nationaux. Department of Zoology, University of Vermont, Burlington, Vermont, USA.

STAFF: No Information.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION : Departement de l'Agriculture Ressources Naturelles et du Developpement Rural, Damien, Haiti.

NAME OF CNPPA COORDINATOR : Allen D. Putney.

INFORMATION DATED: June 1980.

HONDURAS

AREA: 112,087 sq km.

POPULATION: 3,483,388 (1978).

PARKS AND RESERVES LEGISLATION: The Forestry Law, Decree 85 of 1972, gives responsibility for development of national parks and equivalent reserves to the Ministry of Natural Resources, and establishes a methodology for their selection and development. Specific decrees establishing several forest reserves have also been enacted. Decree 103 of 1974 established the Honduran Forest Development Corporation (COHDEFOR) and nationalized the forest industry and all trees with economic value. The General Directorate for Renewable Natural Resources (RENARE), in charge of park and reserve development within the Ministry of Natural Resources, submitted in March 1979 new legislation creating a national protected wildlands system and declaring several new areas as national parks or equivalent reserves. Several of these decrees were approved in 1980; the others are still being reviewed.

PARKS AND RESERVES ADMINISTRATION: The Wildlife and Environmental Resources Department of the General Directorate for Renewable Natural Resources administers protected areas with the cooperation of the Honduran Institute of Tourism and COHDEFOR. COHDEFOR administers the Olancho Hardwood Forest Reserve and has active watershed protection programmes in the Lake Yojoa Multiple Use Area and Cusuco National Park. The Instituto Hondureno de Antropologia e Historia and the Instituto Hondureno de Turismo jointly manage the Copan Ruins National Park.

ADDRESS: (a) Direccion General de Recursos Naturales Renovables, Barrio Guacerique, Boulevard Toncontin, Comayaguela, D.C. Honduras.

(b) COHDEFOR, Edificio Midence Soto, Tegucigalpa, D.C. Honduras.

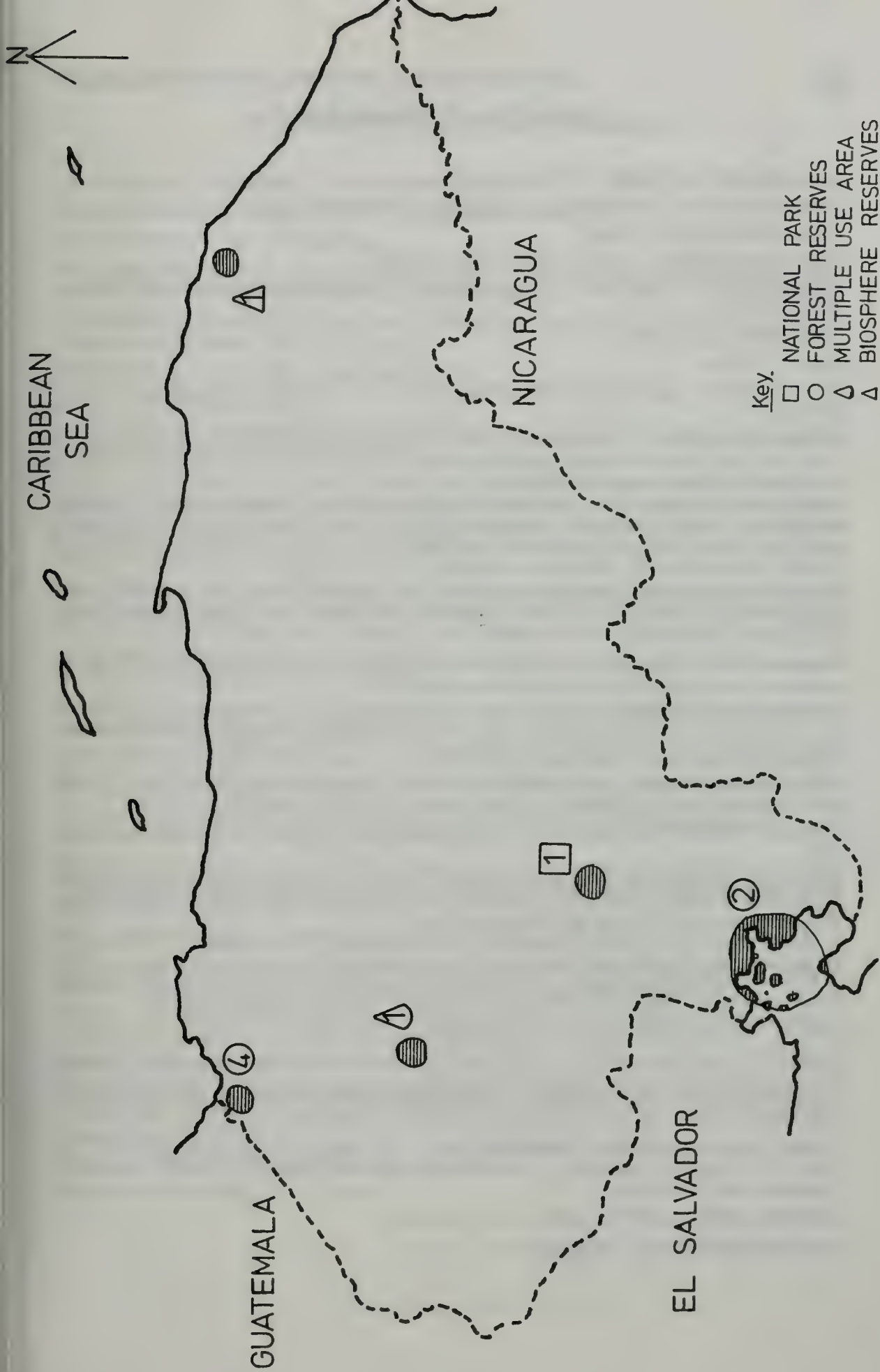
(c) Instituto Hondureno de Antropologia e Historia and the Instituto Hondureno de Turismo, Tegucigalpa, Honduras.

TOTAL AREA UNDER PROTECTION: 57,581 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 La Tigra	7,571
2 Copan Ruins (World Heritage Site)*	65
National Monument	
1 Taulabé Cave	10
Forest Reserves	
1 Olancho*	1,000,000
2 Gulf of Fonseca	50,000
3 Guanaja (proposed)	23,800
4 Cusuco (proposed)	15,000
Multiple Use Area	
1 Lake Yojoa*	34,628
Biosphere Reserve	
1 Rio Platano	(350,000)

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.



(1) La Tigra National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 15 August 1980 by decree law 976.

GEOGRAPHICAL LOCATION: In the mountains of south central Honduras; 10°07'-10°16'N, 87°04'-87°09'W.

ALTITUDE: 1,360-2,290m.

AREA: 7,571 ha.

LAND TENURE: Approximately 70% national lands; the remainder to be purchased by the government.

PHYSICAL FEATURES: The park includes all of the higher elevations of the San Juancito mountains, from which flow a number of streams harnessed to provide potable water for Tegucigalpa. Extremely steep slopes are found throughout the reserve.

VEGETATION: Mainly moist forest and subtropical moist forest (Holdridge system). The lower elevations to 1,800m are covered by a sweet gum - Ocote pine *Liquidambar styraciflua* - *Pinus oocarpa* association. Above 1,800m is a mixed hardwood cloud forest association with oaks *Quercus* spp., wild avocados *Lauralacea*, and *Clusia* spp. as dominants.

NOTEWORTHY FAUNA: There are four species of cats, margay *Felis wiedii* (V), puma *F. concolor*, jaguarundi *F. yaguaroundi* (I) and ocelot *F. pardalis* (V) and collared peccary *Tayassu tajacu*, and quetzal *Pharomachrus mocinno* (V) are also present.

ZONING: The Management Plan for the park (1978) delimits primitive, extensive use, intensive use and special use zones for the park and a buffer zone around it.

DISTURBANCES OR DEFICIENCIES: There is a lack of adequate patrolling and enforcement and encroachment of slash and burn agriculture along boundaries. Military radio communication towers have been erected on one of the highest peaks in the park.

SCIENTIFIC RESEARCH: Specific studies are underway on the quetzal and collared peccary. General resource inventories for all cultural and natural resources have been completed.

SPECIAL SCIENTIFIC FACILITIES: A research laboratory is scheduled to be outfitted in 1982 or 1983.

PRINCIPAL REFERENCE MATERIAL: Barborak, James R., Wild, Kenneth and Bustillo, Jaime (1978). Plan Maestro para la Proteccion y Uso del Parque Nacional La Tigra. Depto. de Vida Silvestre y Recursos Ambientales. Tegucigalpa, Honduras. 45 pp.

Pena, Marcial *et al.* (1977). Investigacion de los Recursos Naturales y Culturales de la Montana La Tigra. Depto. de Vida Silvestre. Tegucigalpa D.C., Honduras. 77 pp.

Wild, Kenneth (1978). Plan de Interpretacion y Uso Publico del Parque Nacional La Tigra. Departamento de Vida Silvestre y Recursos Ambientales. Tegucigalpa, Honduras. 33 pp.

STAFF: A superintendent, 2 guards and 3 labourers.

BUDGET: A one-time donation of US\$ 200,000 by the Honduran Forestry Development Corporation has just been approved to finance implementation of the park master plan. Annual operating budget of \$ 50,000 will probably be assigned in the near future. The budget from RENARE for 1981 is approximately US\$ 20,000.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Jefe, Depto. de Vida Silvestre y Recursos Ambientales, DIGERENARE, Barrio Guacerique #1536, Comayaguela, Tegucigalpa D.C., Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Taulabé Cave National Monument.

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: 100% in effect.

DATE ESTABLISHED: A decree establishing the National Monument was submitted in March 1979; approval was expected soon, but we have no recent information.

GEOGRAPHICAL LOCATION: Near the town of Taulabé in the department of Comayagua, along the major internal highway; 14°36'N, 87°55'W.

ALTITUDE: Cave entrances at approximately 700m.

AREA: Approximately 10 ha.

LAND TENURE: The major cave entrance is located on a government right of way; a decree recently submitted would nationalize other entrances.

PHYSICAL FEATURES: The caves of Taulabé contain at least 3km of passage-ways; 930m have been surveyed in the main cave entrance, and it is possible that entrances are interconnected in one cave system. The caves occur in Cretaceous limestone (Atima formation). Outstanding varieties of speleothems occur, such as helictites, columns, stalagmites, stalagtites and flowstone, ranging in colour from crystalline to blood red. Rooms of up to 30m in height occur.

VEGETATION: The Holdridge subtropical humid life zone is represented. Extensive grazing and slash and burn agriculture has greatly altered the vegetation of the area at the surface; predominant trees include the Caribbean pine *Pinus caribbea* and *Cecropia* spp.

NOTEWORTHY FAUNA: A number of bat species and a large number of arthropods occur in the caves. No blind species have as yet been encountered.

ZONING: A management plan for the caves is now being prepared that will establish a zoning plan within and outside of the major cave entrances.

DISTURBANCES OR DEFICIENCIES: Lack of a decree establishing the caves as a national monument has held up development and protection of the caves; this problem is expected to be resolved soon. Vandalism within the caves has resulted in severe damage to speleothems near the cave entrances. Construction companies have quarried near the cave entrances, and the use of dynamite has caused some damage to cave formations near one major entrance.

SCIENTIFIC RESEARCH: Surveys of the principal cave passageway began in November 1978. As of March 1979, 930m of passageways had been mapped, with good prospects for eventually mapping at least 3km of passageways in known cave areas.

SPECIAL SCIENTIFIC FACILITIES: No special scientific facilities are available at present.

PRINCIPAL REFERENCE MATERIAL: At present only expedition reports and maps are available for the area; a master plan for its development was scheduled to be completed by mid-1979.

STAFF: A hunting and fishing inspector is stationed at the major cave entrance on weekends; public security police guard the major cave entrances at other times.

BUDGET: US\$ 1,500 for 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Chief, Wildlife and Environmental Resources Department, RENARE, Barrio Guacerique, Boulevard Toncontin, Comayaguela D.C., Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Olancho Hardwood Forest Reserve

MANAGEMENT CATEGORY: VI (Resource Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Decree 120 of 1966 created the Olancho Forest Reserve. Decree 103 of 1974 created the National Forestry Development Corporation (COHDEFOR) and nationalized forests in the departments of Olancho and Colon in Eastern Honduras.

GEOGRAPHICAL LOCATION: 14°15'-16°00'N, 85°00'-86°00'W.

ALTITUDE: 0-1,200m.

AREA: Approximately 1,000,000 ha.

LAND TENURE: Almost all national lands.

PHYSICAL FEATURES: The Patuca River, the second largest river in the country, flows through the reserve and is bounded by mountain ranges up to 1,300m in elevation. Rainfall ranges from less than 1,500mm in dry areas to over 2,500mm at higher elevations.

VEGETATION: The Forest Reserve was established especially to protect large areas of forest belonging to the Holdridge Humid Tropical Forest life zone, with important lumber species such as mahogany *Swietenia* sp., San Juan, Spanish cedar *Cedrela* sp. and laurel present.

NOTEWORTHY FAUNA: Fauna includes harpy eagle *Harpia harpyja* (R), the five Honduran cats, jaguar *Panthera onca* (V), ocelot *Felis pardalis* (V), margay *F. wiedii* (V), puma *F. concolor* and jaguarundi *F. yaguaroundi* (I), Baird's tapir *Tapirus bairdii* (V), white-tailed deer *Odocoileus virginianus* and both scarlet and military macaws *Ara macao* and *A. militaris*.

ZONING: COHDEFOR is establishing a zoning plan designed to limit further encroachment by colonists on forested areas not appropriate for agricultural uses.

DISTURBANCES OR DEFICIENCIES: Large-scale colonization by peasants from other parts of Honduras and resulting forest destruction is the major problem.

SCIENTIFIC RESEARCH: DIGERENARE is conducting studies on the biology of white-tailed deer in the reserve; COHDEFOR is conducting forest inventories; the national catastral programme is conducting vegetation surveys.

SPECIAL SCIENTIFIC FACILITIES: None available at present.

PRINCIPAL REFERENCE MATERIAL: COHDEFOR has completed a forest resource inventory report and a study of feasibility of forest exploitation for the zone.

STAFF: COHDEFOR staff include a forest engineer, 5 technicians and an adviser.

BUDGET: COHDEFOR budget of \$ 265,000 annually (1979).

LOCAL PARK OR RESERVE ADMINISTRATION: Director, Olancho Hardwood Forest Protection Project, COHDEFOR, Edificio Midence Soto, Tegucigalpa D.C., Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(2) Mangrove Reserve of the Gulf of Fonseca

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: A decree of 13 October 1958, declared all mangrove zones in the Gulf of Fonseca as a Forest Reserve.

GEOGRAPHICAL LOCATION: On the coast of southern Honduras; 13°30'N, 87°15'-45'W.

ALTITUDE: Sea level to 10m.

AREA: 50,000 ha.

LAND TENURE: Almost entirely government lands.

PHYSICAL FEATURES: The reserve includes the entire zone of mangrove on the coast of the Gulf of Fonseca.

VEGETATION: As described by Carr (1950) the dominant vegetation is red mangrove *Rhizophora mangle* with black mangrove *Avicennia* sp., white mangrove *Laguncularia* sp., buttonwood *Clorocarpus* sp. and manchineel *Hippomane mancinella* on drier sites.

NOTEWORTHY FAUNA: Large numbers of Pacific Ridley sea turtles *Lepidochelys olivacea* (E) nest on the beaches in the area. Small populations of American crocodile *Crocodylus acutus* (E) and brown caiman *Caiman crocodilus fuscus* (V) exist throughout the area. There are commercially important populations of clams and many fishes in the zone. The reserve is an important nutrient source and "nursery" for commercially important fishes and shrimps in the Gulf of Fonseca.

ZONING: None at present.

DISTURBANCES OR DEFICIENCIES: Mangroves are used as firewood and fuel wood in the salt-making industry in the Gulf of Fonseca, and notable destruction has begun in recent years.

SCIENTIFIC RESEARCH: A turtle research programme was initiated by the Fisheries Department of DIGERENARE in 1977.

SPECIAL SCIENTIFIC FACILITIES: None at present.

PRINCIPAL REFERENCE MATERIAL: COHDEFOR has completed forest inventory reports for the mangrove areas.

STAFF: No separate assigned staff on the park from COHDEFOR; RENARE has four inspectors assigned to the area.

BUDGET: No separate budget.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Jefe, Depto. de Vida Silvestre y Recursos Ambientales, DIGERENARE, Barrio Guacerique #1536, Comayagua, Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(3) Guanaja Forest Reserve/Bay Islands National Park (proposed)

MANAGEMENT CATEGORY: II (Proposed National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Partial (50%).

DATE ESTABLISHED: Decree 5 of 10 May 1960 established the Guanaja Forest Reserve. The Ley de Pesca, decree 154 of 29 May 1959 declares coral reefs as protected areas. Legislation establishing wildlands and coral reefs of the Bay Islands as a National Park to be submitted in 1979.

GEOGRAPHICAL LOCATION: In the western Caribbean Sea, 30-50km north of the Honduran mainland; 16°05'-32'N, 85°47'-87°01'W.

ALTITUDE: Sea level to 413m.

AREA: 23,800 ha terrestrial plus approximately 10,000 ha marine (reefs).

LAND TENURE: The marine area is government owned, the terrestrial area mostly private land.

PHYSICAL FEATURES: The Bay Islands consist of three major islands, Roatan (12,740 ha), Guanaja (5,616 ha) and Utila (4,160 ha), along with about 70 smaller cays and islands. Utila is relatively flat and is located on the continental shelf while Roatan and Guanaja are surrounded by deep waters and characterized by steep topography. Rainfall on the islands averages around 1,580mm per year.

VEGETATION: The main forest type is coniferous, consisting of *Pinus caribbea* dominated areas. The principal watersheds have been badly deforested on most islands and an active integral management is needed.

NOTEWORTHY FAUNA: Endemic species of opossum *Marmosa ruatanica ruatanica* and agouti *Dasyprocta ruatanica* occur on Roatan. Each island has one endemic race of *Centurus* woodpecker, a subspecies of *C. aurifrons* on Roatan and Utila and a subspecies of *C. pygmaeus* on Guanaja. Four other species of birds are represented by endemic races on the islands: *Buteo magnirostris*, *Buteogallus anthracinus*, *Ortalis vetula* and *Myiarchus tyrannulus*. Five other species of birds present on the islands do not occur on the Honduran mainland. Small numbers of hawksbill *Eretmochelys imbricata* (E) and green *Chelonia mydas* (E) sea turtles and several species of endemic reptiles and amphibians are found on the islands.

ZONING: No zoning plan is in effect at present; however Olivier (1977) and Robert R. Nathan Associates *et al.* (1975) both proposed zoning plans for the islands.

DISTURBANCES OR DEFICIENCIES: Problems include lack of a comprehensive land use management plan for the islands, manifested in watershed destruction, coral reef degradation and reduction in populations of many wildlife species. Enforcement of existing statutes is totally lacking.

SCIENTIFIC RESEARCH: Roatan is often visited by university coral reef study groups from the USA, but little of their research is published or widely disseminated.

SPECIAL SCIENTIFIC FACILITIES: DIGERENARE has a marine biology laboratory on the north coast of Honduras at La Ceiba, and research is concentrated on economically important marine fish and arthropods.

PRINCIPAL REFERENCE MATERIAL: Nathano, Robert R. and Associates, *et al.* (1975). A Technical and Economic Feasibility Study of the Tornasal-Copan-Roatan Project. Presented to the Instituto Hondureño de Turismo. Tegucigalpa, Honduras.

Olivier, Santiago R. (1977). Informe de la Mision de PNUMA/PNUD. FONDETUR, Tegucigalpa D.C., Honduras.

Rix, Carl Frederick (1972). A preliminary study on the north reef of Roatan. Master's Thesis, North-eastern Illinois University.

STAFF: DIGERENARE has two hunting and fishing inspectors on the islands. COHDEFOR is considering the establishment of a watershed management programme on Roatan with an initial staff of two.

BUDGET: For RENARE approximately US\$ 8,000 annually (1979).

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Jefe, Depto. de Vida Silvestre y Recursos Ambientales, DIGERENARE, Barrio Guacerique #1536, Tegucigalpa, Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.
INFORMATION DATED: 15 June 1981.

(4) Cusuco National Park (proposed)

- MANAGEMENT CATEGORY: II (Proposed National Park).
- BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).
- LEGAL PROTECTION: Total.
- DATE ESTABLISHED: Decree 179 of 20 May 1959, establishes the Cusuco Forest Reserve and recommends its development as a national park.
- GEOGRAPHICAL LOCATION: The reserve is located in the Sierra de Omoa in northwestern Honduras, near the Guatemalan frontier and just inland from the Caribbean. It lies in the Honduran department of Cortes and Santa Barbara, less than 15km west of the second largest city in Honduras, San Pedro Sula (population 150,000 in 1978); 15°22'-15°44'N, 87°55'-88°19'W.
- ALTITUDE: From near sea level to 2,270m.
- AREA: Approximately 15,000 ha.
- LAND TENURE: Probably over 90% national land; no catastral survey completed yet.
- PHYSICAL FEATURES: Steep slopes predominate throughout the park, and Cerro Cusuco at 2,270m is the outstanding physical feature. The Rio Cusuco, which has a waterfall of over 50m, and several smaller streams begin on its slopes. Average temperatures range from about 18°C to 25°C depending on altitude. Rainfall averages of 2,000-2,500mm/year are recorded at nearby stations.
- VEGETATION: Holdridge system: lower montane very humid forest, humid subtropical forest and very humid tropical forests are represented in the park. Vegetation ranges from *Pinus oocarpa* forests at lower elevations on the slopes on the south side of the park through *Pinus pseudostrobus*-*Liquidambar styraciflua* forests from 1,500 to over 2,000m, with evergreen cloud forest species including *Clusia* spp., various Lauraceae and *Quercus* at the highest elevations. The humid tropical forest life zone is found on the north slopes of the park, with common species including cedar *Cedrela* spp., mahogany *Swietenia* spp. and other valuable hardwoods.
- NOTEWORTHY FAUNA: All five Honduran cats, puma *Felis concolor*, margay *F. wideii* (V), ocelot *F. pardalis* (V), jaguarundi *F. yaguaroundi* (I) and jaguar *Panthera onca* (V) are found in the park along with Baird's tapir *Tapirus bairdii* (V), the collared peccary *Tayassu tajacu* and the quetzal *Pharomachrus mocinno* (V).
- ZONING: A comprehensive land use plan for the entire Sierra de Omoa, of which Cusuco National Park is a part, has been prepared by the Watershed Management Division of COHDEFOR.
- DISTURBANCES OR DEFICIENCIES: Slash and burn agriculture has destroyed much of the forest areas surrounding the park and coffee growers are infringing on the middle elevation forests up to 1,700m. A new decree is necessary changing the status of the area from reserve to a national park, to allow RENARE formally to assume management of the area.
- SCIENTIFIC RESEARCH: None.
- SPECIAL SCIENTIFIC FACILITIES: None
- PRINCIPAL REFERENCE MATERIAL: COHDEFOR has completed land use, slopes, and forest cover maps for the area, RENARE published in 1979 an inventory report for the area and a master plan for its development, and COHDEFOR published a land use plan for the entire Sierra de Oma in 1979. We do not have details of either report, or their recommendations.
- STAFF: The municipality of San Pedro Sula maintains forest guards in the park and COHDEFOR has a fire control brigade stationed near the park boundaries.

BUDGET: The area has no separate assigned budget from COHDEFOR, RENARE or the municipality of San Pedro Sula at present, although an estimate of combined expenditures is approximately US\$ 7,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Jefe, Depto. de Vida Silvestre y Recursos Ambientales, DIGERENARE, Barrio Guacerique #1536, Comayaguela, Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Lake Yojoa Multiple Use Area

MANAGEMENT CATEGORY: VIII (Multiple Use Management Area).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: On 13 November 1971, Decree 71 declared the watershed as a forest reserve zone. New legislation has been submitted which will enlarge the reserve to include two more watersheds diverted into the lake.

GEOGRAPHICAL LOCATION: West central Honduras; 14°45'-57'N, 87°53'-88°07'W.

ALTITUDE: 600-2,744m.

AREA: 34,628 ha.

LAND TENURE: Mixed; detailed catastral survey not completed.

PHYSICAL FEATURES: The dominant physical feature of the watershed is Lake Yojoa, with an area of 79 sq km, the only large freshwater lake in Honduras. Average annual rainfall at stations within the lake watershed varies from 2,300 to 3,200mm, increasing from south to north. Annual average temperature for stations in the watershed is 22.7°C, although temperatures are considerably colder on the high peaks which surround the lake, and which include Cerro Santa Barbara, at 2,744m the second highest peak in Honduras.

VEGETATION: Very humid subtropical forest (Holdridge system) covers areas in the watershed up to 1,500m. Most of the vegetation in this zone has been altered by slash and burn agriculture. The lower montane very humid forest covers areas of the reserve from 1,500 to 2,500m and remains largely in pristine condition, with typical species including sweet gum *Liquidambar styraciflua*, oaks *Quercus* spp. and pine *Pseudostrobus* spp. Above 2,500m on Cerro Santa Barbara an *Abies*, *Cupressus*, *Pinus ayacahuite* association occurs.

NOTEWORTHY FAUNA: A great variety of aquatic birds frequent Lake Yojoa. Quetzals *Pharomachrus mocinno* (V) are found on the highest peaks, along with kinkajou *Potus flavus* and Baird's tapir *Tapirus bairdii* (V). The introduced largemouth bass is the predominant fish species of the lake, supporting both commercial and sport fisheries.

ZONING: A model zoning plan detailing agricultural, touristic, urban and protected areas has been devised for the reserve but its implementation must await passage of the revised decree for the reserve. A separate decree which would delimit Cerro Azul as a national park, Cerro Santa Barbara as a biological reserve, and other areas of the watershed as a wildlife refuge and national recreational area, will have been submitted in 1979.

DISTURBANCES OR DEFICIENCIES: Problems include campesino invasions of virgin areas, lake contamination from mining operations, fertilizer and pesticide runoff, and lack of control of the bass fishery. An artificial canal and several diversion dams have enlarged the watershed of the lake; outflow is used for electricity generation.

SCIENTIFIC RESEARCH: COHDEFOR (National Forestry Development Corporation) has

conducted forest inventories in the watershed; the National Forestry School's Lancetilla Experiment Station is conducting botanical surveys of wild areas of the watershed; DIGERENARE is conducting research on the biology of black bass in the lake as well as water quality investigations and general resource inventories of the wild areas of the reserve.

SPECIAL SCIENTIFIC FACILITIES: COHDEFOR maintains a forestry camp at El Zapote north of the lake, available for investigators. The National Forestry School is located at nearby Siguatepeque, with a well-equipped laboratory.

PRINCIPAL REFERENCE MATERIAL: Bertancourt, Jorge A. and Dulin, Paul, eds. (1978). Plan de Uso Multiple Lago de Yojoa (Segunda Fase), Proyecto Inter-Institucional. COHDEFOR, RENARE, CATIE, FAO, UNDP. 196 pp.

STAFF: RENARE has staff of two hunting and fishing inspectors and a wildlands planning adviser; COHDEFOR has a staff of several inspectors and labourers.

BUDGET: Information unavailable as of this date.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Wilberto Aguilar, Jefe, Depto. de Vida Silvestre y Recursos Ambientales, Direccion General de Recursos Naturales Renovables (DIGERENARE), Barrio Guacerique #1536, Tegucigalpa, Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Rio Platano Biosphere Reserve

MANAGEMENT CATEGORY: II & IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Decree of 13 November 1960, established the Ciudad Blanca Archaeological Reserve (approx. 500,000 ha). Decree Law 977 of 15 August 1980, established the Biosphere Reserve. Protected by Decree 79, which establishes the area between the above geographical coordinates as the National Archaeological Park Ciudad Blanca.

DATE ESTABLISHED: May 1979 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: A belt of approximately 15 x 150km oriented north-south, situated in the departments of Gracias a Dios, Colon and Olancho and bordering the Caribbean in the north; 15°15'-15°57'N, 84°35'-85°30'W.

ALTITUDE: Sea level to 1,326m.

AREA: 350,000 ha approximately.

LAND TENURE: Almost entirely national land.

PHYSICAL FEATURES: The topography is varied with mountains occupying 75% of the area, rising to 1326m (Punta Piedra), and flanking the Platano River which bisects the reserve. The upper two thirds of the river course are through mountainous terrain, while the lower reaches form part of the Caribbean coastal plain. There are remarkable rock formations and a waterfall of 500m. The remainder is flat or undulating with wet areas, and grasslands subject to winter flooding. There are a number of lagoons and part of the river is subterranean, disappearing from view below huge basalt rocks. Annual precipitation is approximately 3000mm with an average annual temperature of 26.6°C.

VEGETATION: The majority of the reserve lies within the humid tropical life zone of Holdridge, with less than 10% of the area representing the very humid subtropical life zone. Vegetation types range from pine savannahs with *Pinus caribbea* the principal tree, mangroves and swamp forest fringing the coastal lagoons, gallery forest along the Platano river and major tributaries, and large areas of evergreen hardwood forest. The flora is not well known, but dominant species are coconut *Cocos nucifera*, *Inga* spp., *Cecropia* spp., *Lonchocarpus* spp., *Albizzia carbonaria*, bamboo, *Ceiba pentandra*, *Chusquea* spp. and

Chamaldorea spp. In the higher mountains mahogany *Swietenia macrophylla*, *Tabebuia* spp., cedar *Cedrela odorata*, *Bursera simaruba* and *Chisia salvinii* are found.

NOTEWORTHY FAUNA: About 39 species of mammals, 377 species of birds and 126 of reptiles and amphibians. Threatened species include the giant anteater *Myrmecophaga tridactyla* (V), Baird's tapir *Tapirus bairdii* (V), jaguar *Panthera onca* (V), ocelot *Felis pardalis* (V), puma *F. concolor*, margay *F. wiedii* (V), jaguarundi *F. yaguaroundi* (I), Central American otter *Lutra longicaudis*, manatee *Trichechus manatus* (V), red brocket deer *Mazama americana*, harpy eagle *Harpia harpyia* (R), scarlet macaw *Ara macao*, military macaw *A. militaris*, American crocodile *Crocodylus acutus* (E) and brown caiman *Caiman crocodilus fuscus* (V).

ZONING: In the Reserve Development Plan, natural (core), buffer or manipulative, and stable cultural zones are proposed.

DISTURBANCES OR DEFICIENCIES: A high proportion of the area is natural. It contains a small group of Paya Indians (17 people) and 1500 Miskito Indians, both of great ethnographical importance. There is some illegal hunting, plundering of archaeological remains and a threat of timber exploitation.

SCIENTIFIC RESEARCH: There have been some scientific investigations but much remains to be done. Basic inventories of the natural and cultural resources of the area have been completed, as well as more detailed anthropological and archaeological surveys. The legend of a white city (Ciudad Blanca) has been neither confirmed nor refuted. There are no road communications; access is by water or air. An 'Operation Drake' type of expedition is being planned to the area.

SPECIAL SCIENTIFIC FACILITIES: A small environmental education centre is located near the mouth of the Platano river, and will provide lodging and simple support facilities for visiting scientists.

PRINCIPAL REFERENCE MATERIAL: Carr, A.F. (1950). Outline for classification of animal habitats in Honduras. *Bulletin of the American Museum of Natural History*. Vol. 94, Art. 10. New York.

Davis, L.I. (1972). A field guide to the birds of Mexico and Central America. University of Texas Press, Austin and London.

DIGERENARE y CATIE (1978). La Cuenca del Rio Platano, La Mosquitia, Honduras: Estudio preliminar de los recursos Naturales y Culturales de la Cuenca y un Plan para el Desarrollo de una Reserva de la Biosfera en la region del Rio Platano. 133 pp.

DIGERENARE y CATIE (1980). Plan de Manejo de la Reserva de la Biosfera, Rio Platano. 200 pp.

Direccion General de Minas e Hidrocarburos-Honduras (1966). Inventario nacional de Recursos Fisicos.

Instituto Geografico Nacional (1974). Mapa geologica de la Republica de Honduras.

Molina, R.A. (1975). Enumeracion de las plantas de Honduras. *Ceiba*, Vol. 19, No. 1. Tegucigalpa.

Monroe, B.L. (1968). A distributional survey of the birds of Honduras. Ornithological Monograph No. 7, The American Ornithological Union.

STAFF: A coordinator-superintendent, a resident director and 4 wardens.

BUDGET: For 1980-81, US\$ 100,000 (US\$ 60,000 donation from WWF).

LOCAL PARK OR RESERVE ADMINISTRATION: Mr José A. Ramirez, Coordinator-Superintendent, Deptoi. de Vida Silvestre y Recursos Ambientales, DIGERENARE, Barrio Guacerique #1536, Tegucigalpa, Honduras.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

JAMAICA

AREA: 11,425 sq km.

POPULATION: 2,109,400 (1977).

PARKS AND RESERVES LEGISLATION: The Beach Control Law of 1955 provides for the establishment of 'Marine Parks', the Fisheries Industries Act of 1975 provides for the establishment of 'Fish Sanctuaries', and the Forest Law of 1950 provides for the establishment of 'Forest Reserves'. The conservation plan includes nine areas which should be called national parks, but these areas are not yet afforded adequate protection.

PARKS AND RESERVES ADMINISTRATION: The Conservation and Recreation Division of the Natural Resources Conservation Department is responsible for running the Marine Parks, the Fisheries Division of the Ministry of Agriculture is responsible for Fish Sanctuaries, and the Forest Department of the Ministry of Agriculture is responsible for the Forest Reserves.

ADDRESS: No Information.

TOTAL AREA UNDER PROTECTION: 337 ha.

PROTECTED AREAS:

Marine Parks	(hectares)
1 Ocho Rios	278
2 Montego Bay	59
Fisheries Sanctuaries	
1 Old Harbour*	1,036
2 Port Royal Cays*	518

There are also 95 Forest Reserves with a total area of 113,310 ha.

* No sheets were provided on the Jamaican Fisheries Sanctuaries or Forest Reserves, so it has been assumed that these sites are either resource reserves or multiple use management areas. They have not been included in **TOTAL AREA UNDER PROTECTION**.

MARTINIQUE (France)

AREA: 1,101 sq km.

POPULATION: 316,000 (1978).

PARKS AND RESERVES LEGISLATION: As a 'department' of France, this territory has the same legislation as that country, namely Law 60.708 of 22 July 1960, which applies to the establishment of national parks, and the law of July 1976 (Loi sur la protection de la nature) which applies to all aspects of conservation, including reserves.

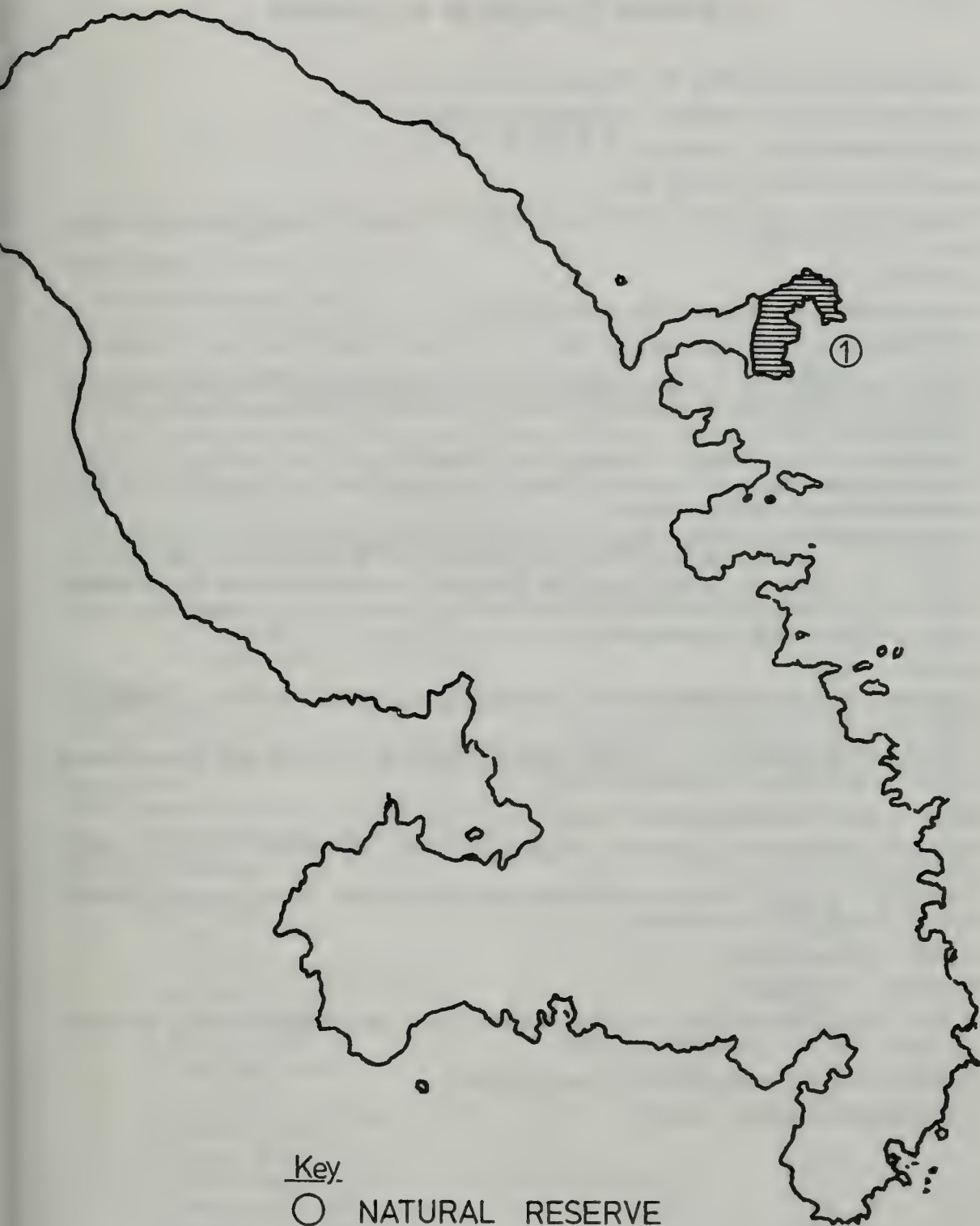
PARKS AND RESERVES ADMINISTRATION: The reserves are under the control of the French Ministère de la Qualité de la Vie (Direction de la Protection de la Nature); in Martinique, the only reserve is under the management of the Parc Naturel Regional, which has no conservation means of its own.

ADDRESS: Parc Naturel Regional, Ancienne Caserne Bouille, Fort-de-France, Martinique.

TOTAL AREA UNDER PROTECTION: 517 ha.

PROTECTED AREAS:

Natural Reserve	(hectares)
1 Caravelle	517



Key.

○ NATURAL RESERVE

Scale Miles
0 1 2 3 4 5

(1) Reserve Naturelle de la Caravelle

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Unknown.

DATE ESTABLISHED: 2 March 1976.

GEOGRAPHICAL LOCATION: Half of the 'Caravelle' Peninsula in the centre of the northeast-facing coast; 14°40'N, 60°58'W.

ALTITUDE: 0-200m.

AREA: 517 ha, within a larger regional Nature Park.

LAND TENURE: Predominantly public land.

PHYSICAL FEATURES: A highly dissected peninsula dominated by cliffs, beaches and reefs. Calcareous sediments (of coral origin) with volcanic substratum (labra dorite, and basalt - partly in hexagonal columns).

VEGETATION: Mangrove/coastal vegetation and xerophytic forest; with *Coccoloba grandifolia*, *Pirsonia fragrans*, *Tabebuia heterophylla*, *Fagara martinicensis*, *Boursera simaruba*, *Syderoxylon petidissimum* and *Byrsomina coriacea*.

NOTEWORTHY FAUNA: White-breasted trembler *Ramphocinclus brachyurus* is found only in the endemic forest. Also noteworthy are the Martinique oriole *Icterus bonana*, Lesser Antillean bullfinch *Loxigilla noctis* (endemic), the Zenaida dove *Zenaida aurita aurita* (endemic to the Lesser Antilles), scaly-breasted ground dove *Columbina passerina trochila* and Caribbean elaenia *Eleania martinica*. This area is very important for migratory species.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: No active management and no control. It has recently been proposed to add a marine area to this reserve.

SCIENTIFIC RESEARCH: Centre Universitaire des Antilles de la Guyane VER Sciences, Pointe Fouillole, Pointe-a-Pitre: M. Jacques Porterop.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL Pinchon, R. (1963). Les Oiseaux; Faune des Antilles Francaises. Fort de France.

Porterop, J. Presqu'île de la Caravelle, PN Regional de la Martinique. Editions Delroisse, 113 rue de Paris, 92 Boulogne-Billancourt, France.

STAFF: One gamekeeper.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Parc Naturel Regional de la Martinique, Boulevard de Verdun, 97200 Fort de France.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: June 1979.

MEXICO

AREA: 1,972,355 sq km.

POPULATION: 66,944,000 (1978).

PARKS AND RESERVES LEGISLATION: Parks are established by Presidential Decree under sections of the Ley Organica de la Administracion Publica Federal, the Ley Federal de Caza, the Ley Forestal, and the regulatory decree of the Forestry Law, Declarations are published in the Diario Oficial.

PARKS AND RESERVES ADMINISTRATION: Responsibility for the national parks can be vested in one of four government agencies, the Secretary of Agriculture and Hydraulic Resources has the majority, but there are also more with the Secretary of Human Settlements and Public Works, one with the Secretary of Tourism, and two with the Federal District of Mexico. One of the serious problems of the management and administration of the Mexican National Parks system is the fact that operation of the parks can be delegated to as many as 14 separate Secretariats (Ley Federal Organica de la Administracion Publica, Diario Oficial, 29 de Diciembre de 1976). This can lead to a certain lack of coordination. Not all of Mexico's National Parks are accepted as national parks in the international sense.

ADDRESS: (a) Subsecretaria Forestal y de la Fauna, Insurgentes sur, 476, Piso Doce, Mexico D.F., Mexico.
(b) CONOPAN, Secretaria de Asentamientos Humanos y Obras Publicos, Colonia navarrete, Mexico D.F., Mexico.

REFERENCES: Gallina T., Maria Pia and Sangri N., Luis (1979). Bellezas Naturales de Mexico. INCAFO, Madrid.

Goebel, J.M. and Meganck, R.A. (1981). Mexico's National Parks: An update and management problem analysis. In *Woodpower - New perspectives of forest usage*. Ed. Tablot, J.J. and W. Swanson. Pergamon Press.

Reyes Rodriguez, Juan Jose A. Estrategia para la Conservacion de los Recursos Naturales. 229pp.

TOTAL AREA UNDER PROTECTION: 550,308 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Nevado de Toluca	51,000
2 La Malinche	45,711
3 Iztaccihuatl—Popocatepetl	25,679
4 Nevado de Colima	22,200
5 Canon de Sumidero	21,789
6 Pico de Orizaba	19,750
7 Zoquiapan y Anexas	19,418
8 Bosencheve	15,000
9 Langunas de Chacahua	14,187
10 Cofre de Perote	11,700
11 Lagunas de Montebello	6,002
12 Cascada Bassaseachic	5,803
13 Constitucion de 1857	5,009
14 Lagunas de Zempoala*	4,669
15 Insurgente Jose Maria Morelos y Pavon	4,648
16 El Chico	1,835
17 Insurgente Miguel Hidalgo y Costilla	1,760
18 Grutas de Cacahuamilpa	1,600
19 Isla Isabela	194
National Reserves	
1 Silvestre Ilas	120,800

Faunal Reserves

1 Ria Celestum	59,130
2 Rio Lagartos	47,840

Wildlife Reserves

1 Cedros Island	1,000
2 Guadalupe Island	1,000

Cetacean Sanctuary

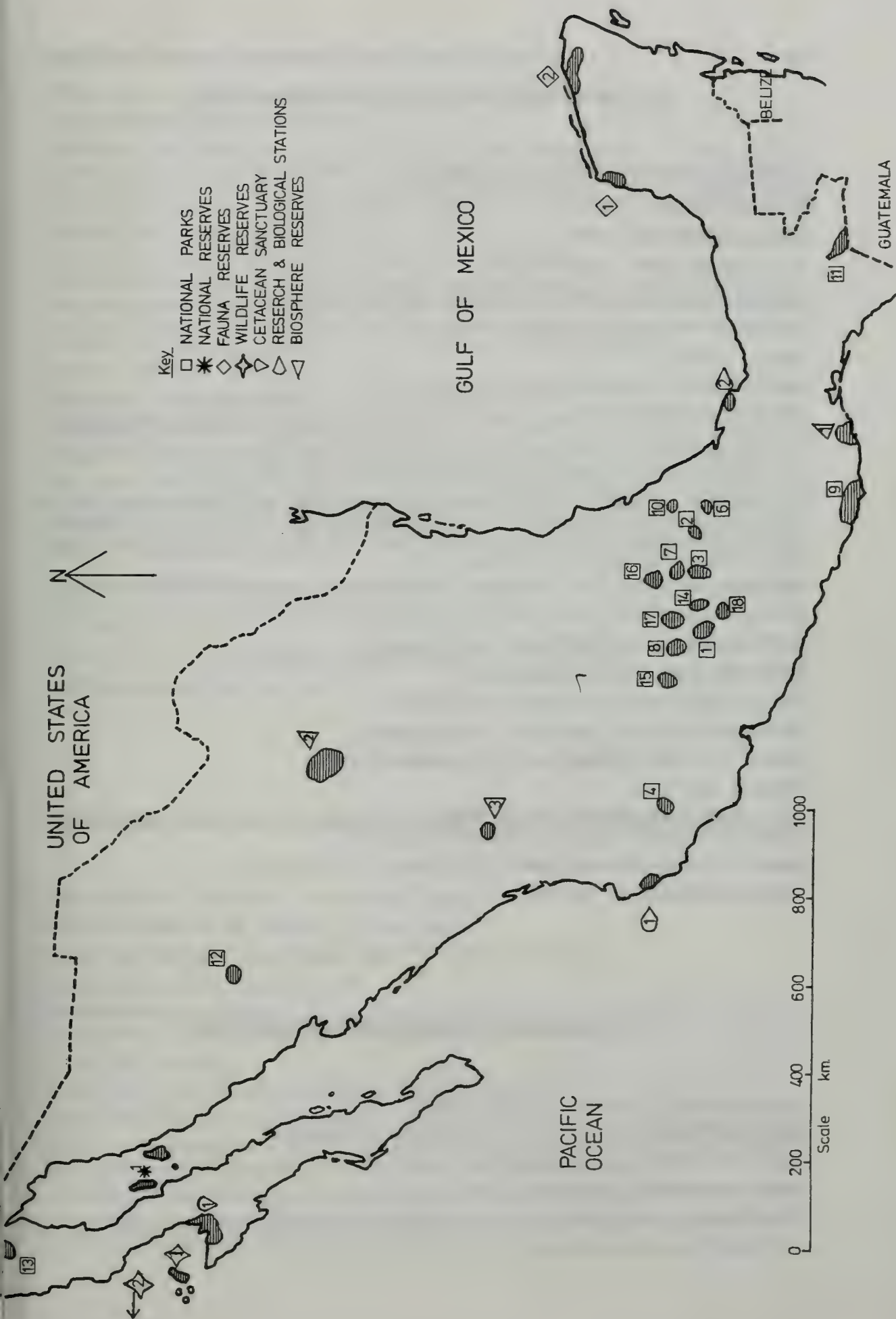
1 Guerrero Negro/Ojo de Liebre Manuela	40,000
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Research & Biological Stations

1 Chamela	1,584
2 Los Tuxtlas	1,000

Biosphere Reserves

1 Montes Azules	(331,200)
2 Mapimi	(100,000)
3 La Michilia	(35,000)



(3) Iztaccihuatl-Popocatepetl National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: 100%.

DATE ESTABLISHED: 29 October 1935.

GEOGRAPHICAL LOCATION: In the states of Mexico, Puebla and Morelos.

ALTITUDE: Reaching approximately 4,800m.

AREA: 25,679 ha.

LAND TENURE: Part national and part public ownership.

PHYSICAL FEATURES: The area consists of Sierra Nevada and the two volcanoes of Iztaccihuatl and Popocatepetl (the latter, at 5452m, the second highest volcano in Mexico). Climate is temperate-subhumid from 3250 to 4000m and cold above 4000m, with permanent snow above 4700m. The rainy season lasts from May/June to November/December, with the winter being dry.

VEGETATION: *Abies religiosa* - *Pinus montezumae* - *P. ayacahuite* forest is found between 2700 and 3300m, with *Pinus hartwegii* forest between 3000 and 4000m. From 4000-4300m are high mountain grasslands or 'zacatonales' of *Festuca tolucensis* and *Calamagrostis tolucensis*. Above 4300m the grassland species change to *Festuca livida* and *Afenaria bryoides*.

NOTEWORTHY FAUNA: The endangered teporingo *Romerolagus dizai* (E) is found within the park.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: No Information.

STAFF: Seven staff, including guards and administrative personnel.

BUDGET: \$ 507,000.

LOCAL PARK OR RESERVE ADMINISTRATION: Secretaria de Asentamientos Humanos y Obras Publicas y Secretaria de Agricultura y Recursos Hidraulicos.

NAME OF CNPPA COORDINATOR: Ing. Juan Jose A. Reyes Rodriguez.

INFORMATION DATED: July 1981.

(14) Lagunas de Zempoala National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: Incomplete (60%).

DATE ESTABLISHED: 30 September 1936.

GEOGRAPHICAL LOCATION: On the border of Mexico and Morelos states.

ALTITUDE: Reaches over 3900m.

AREA: 4669 ha.

LAND TENURE: Communal ownership.

PHYSICAL FEATURES: The principal features are the seven lakes on the lava formations of Huilote volcano, known as the 'Lagunas de Zempoala'. The mean altitude is 2900m with peaks between 3300 and 3900m in height. Mean annual temperature is 12°C at 2800m, 5°C at 4000m. Rainfall averages 1200-1500mm per annum.

VEGETATION: In order of increasing altitude, vegetation consists of oak forest containing *Quercus caudicans* - *Q. rugosa*, *Pinus* forest, and oyamed *Abies religiosa* forest.

NOTEWORTHY FAUNA: Two threatened species, endemic to a small part of Mexico and found in the park, are the 'covejo teporingo' or 'zacatuche' *Romerolagus diazi* (E) and the 'raton de los volcanes' *Nestomodon alstoni*. The 'ajolote' *Rhyacosiredon zempoalensis* is an amphibian endemic to the park and the snake 'vibora de cascabel diadema' *Crotalus transversus* is endemic to this locality.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Ramirez, P.J. (1969). Contribucion el estudio de los Mamiferos del Parque Nacional Lagunas de Zempoala, Morelos, Mexico. In Andes Inst. Biol. Univ. Nac. Autonoma de México, no. 40., Serie Zoologia (2).

STAFF: 10 administration personnel.

BUDGET: \$ 1,217,000.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion General de Reservas y Areas de Recreacion, Sarh.

NAME OF CNPPA COORDINATOR: Ing. Juan Jose A. Reyes Rodriguez.

INFORMATION DATED: July 1981.

(1) Parque Naturel de la Balein Gris, Guerrero Negro/Ojo de Liebre

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 1.8.7 (Sonoran).

LEGAL PROTECTION: Presidential decree.

DATE ESTABLISHED: 11 January 1972.

GEOGRAPHICAL LOCATION: Ojo de Liebre Lagoon (also known as Scammon's Lagoon) and Guerrero Negro Lagoon, Baja California; 28°00'S, 114°20'W.

ALTITUDE: Sea level.

AREA: Surface of lagoons approximately 40,000 ha (not calculated).

LAND TENURE: A strip of land is involved but area not defined. 25,000 ha of Mexican waters.

PHYSICAL FEATURES: The lagoons are physically separated by a low saltmarsh area; the salt content of the water varies between 356 and 450ppm. Offshore sand banks are included.

VEGETATION: Surrounding lands are arid desert with less than 2" rain per year.

NOTEWORTHY FAUNA: Grey whale *Eschrichtius gibbosus* at an estimated population of 11,000; approximately 2,000 whales mate and calf in the lagoons between December and April. Three species of

rails were noted, clapper rails *Rallus longirostris levipes* (V), Virginia rails *Rallus limicola* and Sora rails *Porzana carolinia* (common); also recorded were snowy plovers *Charadrius alexandrinus* and godwits *Limosa*.

ZONING: No zoning, but regulations by the Secretary of Public Works prohibit overflying, tourist launches and motorboats which might disturb the habitat. Three major management zones are seen as applicable to the area - the core area of lagoon and adjacent saltmarshes, a buffer zone of land around the lagoons, and a development zone or zones in which all development for management and tourist facilities would be located.

DISTURBANCES OR DEFICIENCIES: A potential threat could be continued expansion of the salt operations which ship 5,000,000 tons annually and are the major industry for the community, but there is no evidence of disruption at this time. Oil drilling has taken place with three holes producing nothing. The reserve is surrounded by a National Park which is not effectively managed.

TOURISM: This is seen as a major future function of the park and an important move towards fostering awareness of the importance of cetaceans generally. Viewing towers, anchored rafts and other viewing facilities, with controlled visitor access, may be provided though careful planning is required. It has been proposed that the development zone should have facilities such as parking space, hotels, restaurants, tent and mobile camping areas and picnic areas, along with staff housing and other management facilities.

SCIENTIFIC RESEARCH: A bilateral agreement between the USA and Mexico through the National Marine Fisheries Service, undertaken by Dr Ken Norris, University of California Santa Cruz, and Dr Barbara Javor, G.N. Salt Works (biologist).

SPECIAL SCIENTIFIC FACILITIES: None within the reserve, but a laboratory at the Salt Company has been made available.

PRINCIPAL REFERENCE MATERIAL: Grey Whale Studies by Dr Norris.

Lionel Patino Talmentes (Fundacion Medio Ambiente). Mexican/USA Grey Whale Conservation Committee, Milton Kaufmann (Monitor International).

WWF/IUCN Project 1405. International System of Cetacean Sanctuaries. Various reports.

STAFF: Mr Mario Rueda, a volunteer conservationist with some degree of government authority, is known as the Honorary Administrator, Guerrero Negro.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Mr Mari Rueda, Ado Postal 139, Guerrero Negro.

NAME OF CNPPA COORDINATOR: S. Cuenas Salas.

INFORMATION DATED: 9 February 1979, with recent additions made by PADU, March 1982.

(1) Montes Azules Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.1.1 (Campechean).

LEGAL PROTECTION: Created by Presidential Decree.

DATE ESTABLISHED: Created a biosphere reserve by Presidential Decree of 12 January 1978. Approval by MAB Bureau May 1979.

GEOGRAPHICAL LOCATION: In Chiapas state in south-east Mexico, between the Lacantum and Locania rivers; 16°09'-16°53'N, 90°30'-91°45'W.

ALTITUDE: 350-1400m.

AREA: 331,200 ha.

LAND TENURE: Federal land, communal land and some private land.

PHYSICAL FEATURES: Ranges of small hills and valleys with rivers and small lakes on calcareous soils.

VEGETATION: Tropical rainforest at lower altitudes; pine forest above. The reserve and surrounding forest contain some 500 species of tree.

NOTEWORTHY FAUNA: There are a number of important species of mammal: jaguar *Panthera onca* (V), margay *F. wiedii* (V) and ocelot *F. pardalis* (V), collared peccary *Tayassu tajacu*, Baird's tapir *Tapirus bairdii*, spider monkey *Ateles geoffroyi* (V) and howler monkey *Alouatta palliata*. Also *Crocodylus moreleti* (E), harpy eagle *Harpia harpyja* (R), scarlet macaw *Ara macao* and great curassow *Crax rubra*. The area was an important Pleistocene refuge.

ZONING: No zoning has yet been established inside the biosphere reserve, but it is surrounded by a forest reserve of 2,612,300 ha.

DISTURBANCES OR DEFICIENCIES: There was some Maya settlement in the area. More recently the forest has been exploited for chichle and mahogany, but has not been seriously altered by this. There is now pressure from shifting cultivators in the south-west.

SCIENTIFIC RESEARCH: There have been surveys of geology, soils, archaeology, mammals, birds, insects, plants and soil fauna; and there are plans for cooperative research between the government and the universities.

SPECIAL SCIENTIFIC FACILITIES: There are no research facilities yet, but a laboratory is planned.

PRINCIPAL REFERENCE MATERIAL: A book is in press in which available information is assembled.

STAFF: None full-time, but five researchers part-time.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Programme MAB Mexico, Secretaria Forestal y de la Fauna, c/o Secretaria de Agricultura et Recursos hidraulicos, Insurgentes Sur No. 476, Mexico D.F.

NAME OF CNPPA COORDINATOR: S. Cuenas Salas.

INFORMATION DATED: Information received from Unesco.

(2) Mapimi Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 1.9.7 (Chihuahuan).

LEGAL PROTECTION: For the time being, all hunting has been voluntarily suspended, especially that of the desert tortoise. The peasants supervise observancy of this ban.

DATE ESTABLISHED: January 1977 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: Situated north-east of the town of Ceballos in the point formed by the boundaries of the states of Durango, Chihuahua and Coahuila. The reserve lies in a hollow or basin surrounded by small mountain ranges running more or less parallel from north to south in the large catchment area known as Bolson de Mapimi; 26°29'-52'N, 103°56'W.

ALTITUDE: 1100-1350m.

AREA: No legal boundaries have been fixed. Work has begun on an area of 20,000 ha regarded as the core zone.

LAND TENURE: There are various common public lands and ranches. A company has been formed under the direction and authority of the Government of the State of Durango and the scientific direction of

the Institute of Ecology. It comprises the public authorities and graziers in the area and the appropriate federal authorities.

PHYSICAL FEATURES: Alluvial deposits predominate, consisting of recent Pleistocene gravels, clays and muds. Outcrops of igneous rock from the tertiary period and volcanic rocks (rhyolites, andesites and basalts) are also found. There are isolated mountains and extensive interconnected plains, and a spring in the core zone. The average annual rainfall is 200mm; the mean monthly temperature varies between 11.2°C and 28.4°C.

VEGETATION: The reserve belongs to the Chihuahua arid zone, with a large quantity of endemics. Microphyllous shrub species give the reserve its characteristic plant determining the general physiognomy of the area, together with fleshy-leaved species (*Agave* spp., *Hechtia* spp.), thick-stemmed species (*Pastinaca* spp.) and large expanses of grass *Hilaria mutica*.

NOTEWORTHY FAUNA: The pronghorn *Antilocapra americana* disappeared a few years ago. The mule deer *Odocoileus hemionus*, the giant tortoise *Gopherus flavomarginatus* (E), the coyote *Canis latrans*, the lynx *Felis rufus* and the puma *F. concolor* are characteristic. There is a rich fauna adapted to the arid conditions.

ZONING: There is a core zone surrounded by a buffer area.

DISTURBANCES OR DEFICIENCIES: The region has been little disturbed, except for sporadic hunting and, to a lesser degree, extensive stock raising.

SCIENTIFIC RESEARCH: Several institutions (foreign and domestic) are already undertaking a large number of studies. Examples include the study of herpetofauna, exophysiology of dominant reptile species, study of the biology of the desert tortoise, study of the biology of raptorial birds, and regeneration of desert vegetation after over-grazing, fire and various types of human activity. With the help of associations of bee-keepers, it is planned to subsidize certain young 'ejidatarios' (communal farmers) so that they can learn the techniques of bee-keeping based on the flowers of desert plants. At San Ignacio there is a camp near the only spring in the zone, and a laboratory is being built in the 20 ha of desert belonging to the Institute of Ecology, San Ignacio. Light aircraft and motor vehicles will be readily available from the Government of the State of Durango and camping equipment has been provided by the Secretariat for the National Heritage.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Martinex, O. Enrique and Morello, J. (1976). El Medio Físico y las Unidades Fisiomórfico-Florísticas del Bolson de Mapimi. Institute of Ecology, Mexico.

Informes del Programa Nacional Indicativo de Ecología Tropical; (1976). National Board of Science and Technology, Mexico.

STAFF: 14 research workers, 8 research assistants and technicians, and 7 students are engaged in research work. The protection of the reserve is the responsibility of the peasants.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto de Ecología. Apartado postal 18-845, Mexico 18, D.F., Mexico.

NAME OF CNPPA COORDINATOR: S. Cuenas Salas.

INFORMATION DATED: Information received from Unesco.

(3) La Michilia Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 1.21.12 (Madrean-Cordilleran).

LEGAL PROTECTION: Complete protection of fauna and flora throughout the core zone. Stock-raising and controlled hunting in the buffer zone.

DATE ESTABLISHED: January 1977 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: To the south of the town of Durango in the Sierra de Michis, a branch of the Sierra Madre Occidental. On the north-east is the town of Vicente Guerrero, on the west the village of Mezquital, and on the south-east the Sierra de Uruca, which is the boundary between the States of Durango and Zacatecas. 23°27'N, 104°15'W.

ALTITUDE: 2250-2850m.

AREA: 7000 ha of core zone (the reserve proper) and approximately 35,000 ha of buffer zone.

LAND TENURE: The reserve proper (Cerro Blanco) is owned by the government of the State of Durango who will transfer it to the Institute of Ecology. The buffer zone contains the communal farm (Ejido) of San Juan de Michis and ranches owned by small graziers. An association is being formed, under the control of the government of the State of Durango and the scientific direction of the Institute of Ecology, to coordinate the activities of the communal farm and the small graziers in order to protect the fauna and flora and to test new systems for the management of the natural resources. The appropriate federal authorities will participate in this association.

PHYSICAL FEATURES: The Sierra de Michis consists of igneous rock of the Tertiary period. The geological basis of the La Michilia area is acid rock (tuff). Particularly in the reserve proper, the topography is marked by a high degree of relief. The deep soils are sandy clay, and on the slopes are stony. There are several ephemeral streams and lagoons, besides the two permanent streams, Laurel to the west and Temascal to the south-east. There are also marshy meadows in the core area. The annual rainfall ranges between 500mm and 700mm, and the average annual temperature varies between 12°C and 28°C.

VEGETATION: A pine and holm oak forest takes up the greater part of the reserve proper and the buffer area, consisting of associations of *Pionus lumholtzii* and *Quercus rugosa*, with *Arctostaphylos polifolia* and *Juniperus durangensis*. There are also holm oak and pine forests with associations of *Quercus chihuahuensis*, *Q. siderofila*, *Q. fulva*, *Pinus arizonica*, *P. engelmanni* and *P. ayacahuite*. Generally speaking, where the soil is not very deep, on the slopes, it is covered with chaparral vegetation characterized by dense clumps of *Arctostaphylos pungens*, isolated species of *Quercus potosina* and *Q. rugosa*. There are also natural pastures of *Aristida* spp., *Panicum* spp., *Bromus* spp., *Senecio* spp. and *Stevia* spp.

NOTEWORTHY FAUNA: Two species of native fauna have decreased to the point where they are very rare: black bear *Ursus americanus* (which was hunted until about 15 years ago) and wolf *Canis lupus* (occasionally hunted). The important species are white-tailed deer *Odocoileus virginianus*, puma *Felis concolor*, collared peccary *Tayassu tajacu*, coyote *Canis latrans* and turkey *Meleagris gallopavo*. Otter *Lutra longicaudis* is found in the stream Temascal. A few examples of military macaw *Ara militaris* remain.

ZONING: The Cerro Blanco core zone is the reserve proper. There is an adjacent buffer zone of mountains and plains to the north-east, east and south-east of the reserve.

DISTURBANCES OR DEFICIENCIES: The Cerro Blanco contains natural formations which remain unaltered. The rest of the area shows some signs of disturbance following hunting, very restricted farming, utilization of the forest and some stock raising.

SCIENTIFIC RESEARCH: Four Mexican and two foreign institutions are involved in research at La Michilia. Present studies include the feeding habits of the white-tailed deer *Odocoileus virginianus*, development of new crops such as strawberries, the agricultural potential of the area, its ornithology and botany.

SPECIAL SCIENTIFIC FACILITIES: A house near Cerro Blanco has been made available by Mr Eduardo de la Pena, and another on the communal farm of San Juan de Michis. Transport facilities are provided by the government of the state.

PRINCIPAL REFERENCE MATERIAL: Informes del Programa Nacional Indicativo de Ecología Tropical (1976). National Board of Science and Technology, Mexico.

Baker, R. and Keever, J. (1962). Mammals of the Mexican State of Durango. *Publ. Mus. Mich. State Univ. Biol. Ser.* 2: 25-146.

Galina, S., Serrano, V. and Mau Ma, E. Estudio sobre el venado cola-blanca. Institute of Ecology, Mexico.

STAFF: 29 research workers, 2 research assistants and 5 students. The inhabitants of the zone cooperate in the protection of the reserve.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto de Ecologia, Apartado Postal 18-845, Mexico 18, D.F., Mexico.

NAME OF CNPPA COORDINATOR: S. Cuenas Salas.

INFORMATION DATED: Information received from Unesco.

MONTSERRAT (UK)

AREA: 98 sq km.

POPULATION: 12,160 (1977).

PARKS AND RESERVES LEGISLATION: In process of being drafted.

PARKS AND RESERVES ADMINISTRATION: Montserrat National Trust.

ADDRESS: Montserrat National Trust, Box 332, Plymouth, Montserrat, West Indies.

TOTAL AREA UNDER PROTECTION: There are no areas established yet.

PROTECTED AREAS:

National Park	(hectares)
1 Montserrat (proposed)	810

(1) Montserrat National Park (proposed)

MANAGEMENT CATEGORY: Proposed National Park (II).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: None.

DATE ESTABLISHED: Proposed.

GEOGRAPHICAL LOCATION: On the southern mountain of the island; 16°42'N, 62°12'W.

ALTITUDE: 100-800m.

AREA: 810 ha.

LAND TENURE: 70% privately owned.

PHYSICAL FEATURES: Area covers Castle Peak and Chances Peak, the highest peaks on the island, which are volcanic in origin. Active thermal springs and sulphur vents. Rainfall is 60-100".

VEGETATION: Cloud forest with smaller areas of moist forest.

NOTEWORTHY FAUNA: Habitat of threatened Montserrat oriole *Icterus oberi*.

ZONING: None as yet.

DISTURBANCES OR DEFICIENCIES: About 30% of the area proposed has been altered for agriculture at one time or another.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Montserrat National Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 12 October 1979.

NETHERLANDS ANTILLES

AREA: 1,020 sq km.

POPULATION: 238,000 (1979).

PARKS AND RESERVES LEGISLATION: No general legislation on parks or reserves with the exception of a law, accepted but not yet effective, on establishing Underwater Parks ('marine reserves').

PARKS AND RESERVES ADMINISTRATION: No governmental organization, but a private one, 'Netherlands Antilles National Parks Foundation' ('Stichting Nationale Parken Nederlandse Antillen', called 'STINAPA').

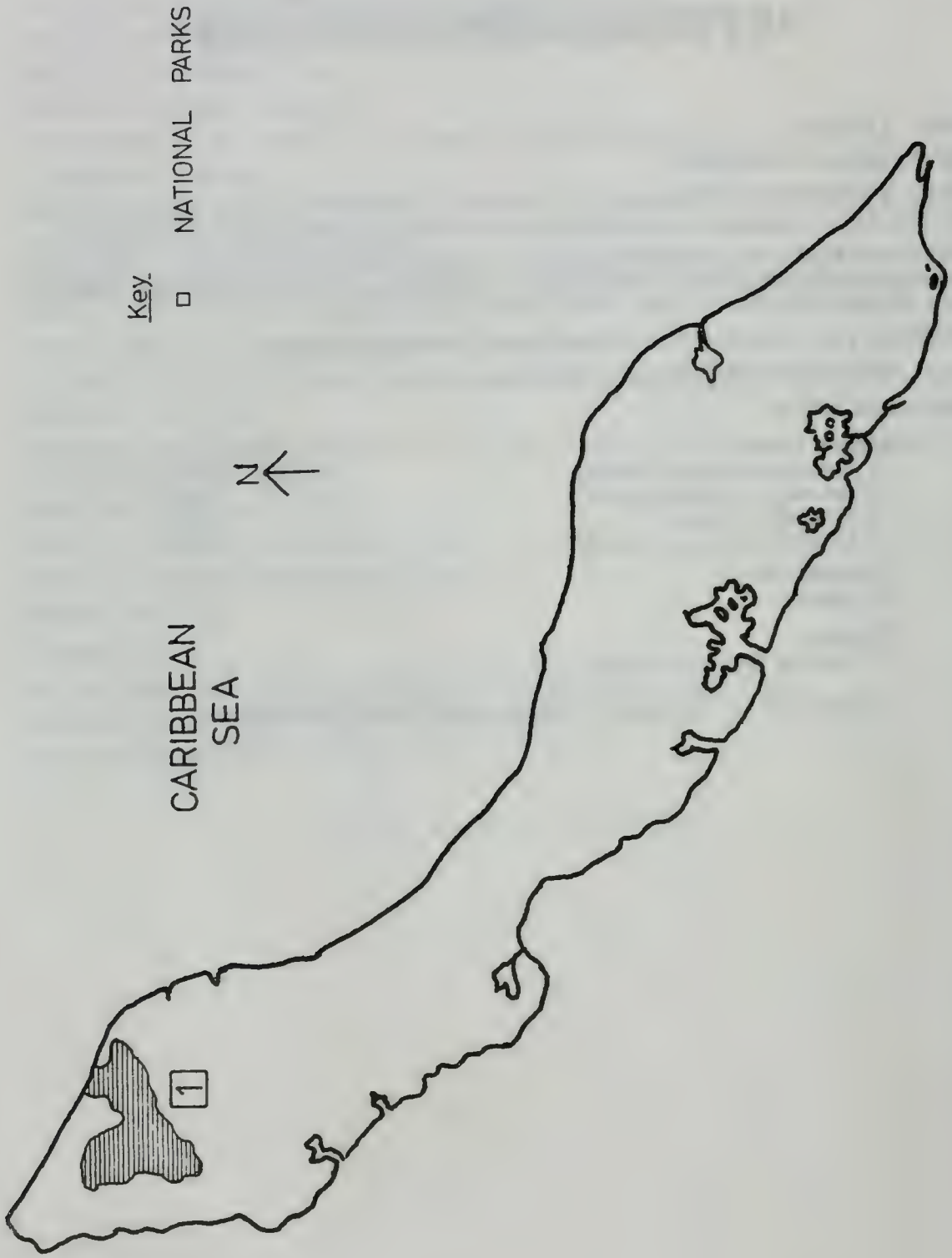
ADDRESS: p.a. CARMABI, PO Box 2090, Curacao, Netherlands Antilles.

TOTAL AREA UNDER PROTECTION: 10,000 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Washington-Slagbaai, Bonaire	5,900
2 Jamanota, Aruba (proposed)*	3,000
3 Christoffel, Curacao	1,500
4 Josefdal, Curacao (proposed)*	15
Underwater Park	
1 Bonaire	2,600
Sanctuary	
1 Flamingo Sañctuary, Bonaire*	55

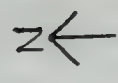
* These areas are not included in **TOTAL AREA UNDER PROTECTION**.



Key.

□ NATIONAL PARKS

CARIBBEAN
SEA



1

(1) Washington-Slagbaai National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: May 1969, enlarged in September 1977.

GEOGRAPHICAL LOCATION: Northwest tip of Bonaire; 12°17'N, 68°23'W.

ALTITUDE: Sea level up to 241m.

AREA: 5900 ha (400 ha having been added in 1977).

LAND TENURE: One part owned by the Government but managed by STINAPA, the other part owned and managed by STINAPA.

PHYSICAL FEATURES: In the northeast, north, west and southwest bordered by the sea, in the south by the Oil Terminal BOPEC, and in the east by privately owned land. The coastal fringe is of coral limestone, the central part volcanic (Upper Cretaceous). There are several large landlocked bays (good feeding grounds for flamingos and wading birds). An old Plantation House in dilapidated state can be found at the Boca of Slagbaai. The wet season is October to January, and annual rainfall is 532mm. Mean temperature is 27.6°C, mean maximum 31.2°C and mean minimum 24.2°C.

VEGETATION: Saltflat vegetation: mangroves, *Batis maritima* and *Suriana maritima*. Limestone plateau: *Metopium brownei* and *Coccoloba swartzii*. Washikemba formation vegetation: *Haematoxylon brasiletto*, *Opuntia wentiana*, *Opuntia curassavica* (endemic), *Croton flavens*, *Acacia tortuosa*, *Prosopis juli-flora* and candle cacti (one endemic species).

NOTEWORTHY FAUNA: This park is a refuge for a threatened yellow-shouldered parrot *Amazona barbadensis rothschildi* (reduced to only 100 birds in 1978), the brown-throated parakeet *Aratinga pertinax xanthogenius* and the pearly-eyed thrasher *Margarops fuscatus bonairensis* (all endemic - though there is some query as to whether *rothschildi* is a valid subspecies of *Amazona*); *Phalacrocorax olivaceus*, brown noddy *Anous stolidus*, 7 lizard species (2 of them endemic) and about 30 landsnail species (half of which are endemic). The supersaline landlocked bays are feeding grounds for flamingos (Phoenicopteridae), herons (Ardeidae), stilts (Recurvirostridae), wading birds, terns (Laridae) etc. The coral reefs along the coast are of exceptional beauty.

ZONING: In 40% of the park area goats are present (about 1 per ha); in the other part there are a few goats (about 1 per 10 ha).

DISTURBANCES OR DEFICIENCIES: Poaching of goats (no problem for the park!), iguanas, noddies (at night, when they roost on the cliffs of the north coast), and - worst of all - almost all juvenile parrots belonging *Amazona barbadensis rothschildi* (which were sold for \$50).

SCIENTIFIC RESEARCH: Parrot research *Amazona barbadensis rothschildi*.

SPECIAL SCIENTIFIC FACILITIES: A small dormitory and a car.

PRINCIPAL REFERENCE MATERIAL: Field Guide National Park Washington, Bonaire, (1979). 'STINAPA' Series no. 9.

STAFF: 3 surveyors.

BUDGET: US\$ 20,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Mr Tom Van Hof, together with a Park Board of STINAPA.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: September 1979.

(3) Christoffel National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: June 1978.

GEOGRAPHICAL LOCATION: On the northwest tip of Curacao; 12°20'N, 69°08'W.

ALTITUDE: Sea level to 375m.

AREA: 1500 ha.

LAND TENURE: Land owned by the Island Government, park managed by STINAPA.

PHYSICAL FEATURES: In the northeast bordered by the sea, in the east, south and west bordered by privately owned plantations, in the northwest and north bordered by inhabited areas. Coastal fringe: coral limestone; next zone: diabase; central zone: Knip formation (deepsea sediments raised by tectonic movement) in the limestone grottos along the coast. In the eastern part Indian signs are present. The 18th century Plantation House Savonet, together with many barns and sheds and corals, is of extreme beauty. Wet season is October to January, and annual rainfall is 574mm. Mean temperature is 27.5°C, mean maximum 30.9°C and mean minimum 25.2°C.

VEGETATION: Limestone plateau: *Metopium bronei* and *Coccoloba swartsii*; diabase vegetation: *Haematoxylon brasiletto*, *Condolia henriquesi* (endemic), *Opuntia wentiana*, *Croton flavens*, *Acacia tortuosa*, *Prosopis juliflora* and candle cacti. Knip formation vegetation with some endemic trees: *Sabal* spp., *Xylosma arnoldoi*, *Sorocea arnoldoi*, *Ficus brittonii*, *Aulomyrcia curassavisa* and others, and 4 orchid species, 3 *Tillandsia* species, *Ananas comosus* and *Anthurium* spp.

NOTEWORTHY FAUNA: The following species all breed in the park: white-tailed deer *Odocoileus virginianus* (possibly a threatened endemic subspecies), the cottontail *Sylvilagus floridanus nigrinuchalis* (endemic), white tailed hawk *Buteo albicaudatus*, crested bobwhite *Colinus cristatus*, *Tyto alba bargei* (an endemic subspecies which is almost extinct), and brown-throated parakeet *Aratinga pertinax pertinax* (endemic). Also found are 5 dove species, 7 lizards (2 of them endemic), 1 snake (endemic) and 30 landsnails (half of which are endemic).

ZONING: 11 small areas are fenced off against goats, for a natural reforestation experiment.

DISTURBANCES OR DEFICIENCIES: Picking of plants, especially orchids (mostly by Europeans) and poaching of goats (no problem!) and of iguanas by local people.

SCIENTIFIC RESEARCH: 1) Natural reforestation experiment (in areas fenced off from goats); 2) Study of the plague of the (introduced) rubber vine (*Cryptostegia grandiflora*); 3) Quantitative study of the influence of goats on the vegetation.

SPECIAL SCIENTIFIC FACILITIES: Facilities of the Caribbean Marine Biological Institute (CARMABI), Curacao, including cars, dormitory, library etc.

PRINCIPAL REFERENCE MATERIAL: Stoffers, A.L. (1956). The vegetation of the Netherlands Antilles. Studies Flora Curacao no. 1, Utrecht.

Stoffers, A.L. (1962). The Flora of the Netherlands Antilles, vol. 1.

Annual reports of STINAPA, published in the 'STINAPA' series.

STAFF: One manager (Dick Hoogerwerf) and 3 park rangers.

BUDGET: US\$ 75,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Mr Dick Hoogerwerf and a Park Board of STINAPA.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: September 1979.

(1) Bonaire Underwater Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: 90%.

DATE ESTABLISHED: May 1979.

GEOGRAPHICAL LOCATION: All around the islands of Bonaire and Klein Bonaire; 12°02'-12°18'N, 68°12'-68°25'W.

ALTITUDE: Sea level down to -60m.

AREA: About 2,600 ha.

LAND TENURE: Territorial waters owned by the Government.

PHYSICAL FEATURES: Very stable physical conditions; salinity 36‰, temperature 26°C in February and up to 28°C in September. There are almost no nutrients, and the water is extremely clear and poor in plankton. Torrential rains may bring fresh water and mud from the land into the sea, but this disturbance is rather rare. In the lee of the trade winds the water is very calm; the eastern shoreline is almost the only one with wave action. A submarine reef terrace between 0 and 10m is followed by a steep reef slope of 40° down to at least 30m. Lac Bay is a shallow lagoon.

VEGETATION: In the 750 ha lake are found mangroves and *Thalassia*. The fringe along the coast has all types of algae: *Sargassum* in the tidal zone, calcareous algae (reef builders) in the tidal zone and deeper, filamentous algae, zooxanthellae in coral tissue, and boring algae.

NOTEWORTHY FAUNA: An extremely rich coral reef fauna consisting of all elements also found elsewhere in the Caribbean. Unique because of its unspoiled character.

ZONING: None until now but, in the future, some damaged reefs will be closed for guided tours for about 3 months, for recovery if necessary.

DISTURBANCES OR DEFICIENCIES: Some spearfishing and coral picking (although prohibited by law), but at this moment no serious threat; anchoring, which is of increasing importance; sewage, oil spills etc., of local importance; unintentional disturbance, touching corals, whirling up sand etc., of local importance.

SCIENTIFIC RESEARCH: The Park Management, in close cooperation with the Caribbean Marine Biological Institute in Curacao (CARMABI) is engaged in coral research, especially related to park management techniques.

SPECIAL SCIENTIFIC FACILITIES: Karpata Ecological Centre with wet and dry laboratories with basic equipment. A small dormitory, motorboat, car and some underwater equipment.

PRINCIPAL REFERENCE MATERIAL: About 250 papers published by CARMABI, many of them in Studies Fauna Curacao, Utrecht. Also personal communications from Tom Van Hof.

STAFF: Eric Newton (Park Manager), Franklin Winklaar and Christie Dovale.

BUDGET: US\$ 70,000 per year (quoted in 1979). Quoted in May 1982 as 275,000 Dutch guilders for 4 years.

LOCAL PARK OR RESERVE ADMINISTRATION: Both staff members and an Underwater Park Board provided by STINAPA.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: May 1982.

(1) Flamingo Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: November 1969.

GEOGRAPHICAL LOCATION: At the southern tip of Bonaire; 12°02'30"N, 68°15'W.

ALTITUDE: Sea level.

AREA: 55 ha.

LAND TENURE: Owned by International Antillean Salt Co (AISCO) and supervised by the Flamingo Sanctuary Commission, p.a. AISCO, Bonaire.

PHYSICAL FEATURES: Formerly part of the vast Pekelmeer but, since 1969, surrounded by the Solar Salt Works of AISCO. By means of a dike around the area, and a pump, the water in the Sanctuary can be drained and kept at a certain level. Soil consists of coral debris, coral sand and mud.

VEGETATION: Almost barren. Under water is a sparse algal vegetation in and on top of the muddy bottom. In the dry parts there is no visible vegetation.

NOTEWORTHY FAUNA: One of the four breeding sites left in the Caribbean for the red flamingo *Phoenicopterus ruber ruber*. The number of breeding pairs varies widely; there have been years without any breeding (1944-1950), but there are also years when 2150 breeding pairs are present. The average may be about 1000 pairs per breeding season.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Overflying sportplanes (although prohibited by law) in the breeding season, resulting in the birds leaving their nests, often without returning. Intruders - sometimes poachers, but mostly photographers and ornithologists! also disturb breeding, resulting in unhatched eggs and starving juveniles.

SCIENTIFIC RESEARCH: Since 1959, there has been regular scientific research, first by Jan Rooth, and since 1975 also by Bart de Boer, on food habits, availability of foods, migration, breeding behaviour, mortality etc.

SPECIAL SCIENTIFIC FACILITIES: None. No visitors or scientists are allowed to enter the Sanctuary during the months when the flamingos are breeding.

PRINCIPAL REFERENCE MATERIAL: de Boer, B.A. (1979). Flamingos on Bonaire and in Venezuela (STINAPA Documentation Series no. 3).

Rooth, J. (1965). The flamingos on Bonaire. Utrecht.

Rooth, J. (1976). Ecological aspects of the flamingos on Bonaire (STINAPA Documentation Series no. 11).

STAFF: Rene Hakkenberg (Manager of AISCO) controls the Sanctuary.

BUDGET: About US\$ 4,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Mr Hakkenberg, AISCO.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: September 1979.

NICARAGUA

AREA: 148,005 sq km.

POPULATION: 2,217,500 (1978).

PARKS AND RESERVES LEGISLATION: The new government of Nicaragua has established by decree the National Park Service (7 March 1980) under the auspices of the Instituto Nicaraguense de Recursos Naturales y del Ambiente (IRENA) (created by law, 24 August 1979). There are only two parks with specific legislation: Volcan Masaya National Park (23 May 1979) and Saslaya National Park (27 March 1971).

PARKS AND RESERVES ADMINISTRATION: The institution specifically given responsibility to protect National Parks and Reserves is the National Park Service, which is also in charge of recreation areas.

ADDRESS: (a) Dr Jorge Jenkins, Director General, Instituto Nicaraguense de Recursos Naturales y del Ambiente (IRENA), Managua, Nicaragua.
(b) Ing. Enrique Cedeno, Director Servicio de Parques Nacionales, IRENA, Managua, Nicaragua.

TOTAL AREA UNDER PROTECTION: 17,300 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Saslaya	11,800
2 Masaya Volcano	5,500
Natural Resources Reserve	
1 Bocay—Waspuk—Wawa (proposed)*	1,100,000

(1) Saslaya National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Protection afforded by National Park status is said to have the support of the local inhabitants. Hunting, fishing, cutting of forest and farming within the area are prohibited.

GEOGRAPHICAL LOCATION: About 75km southwest of Bonanza and 34km west of Siuna in the hinterland of the Department of Zelaya; 13°45'N, 83°00'W.

ALTITUDE: 200-1,594m.

AREA: 11,800 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: A complex of old volcanic peaks of which the highest, Cerro Saslaya (1,594m) dominates the centre of the park; the other peaks within the park boundary, ranging in height from 1,150 to 1,350m, are named El Inocente, Albondiga, Garrapata, El Toro, La Pimienta and El Hormiguero. Numerous small streams cascade from the mountains into the Rio Wani, which bounds the park on the north and is an upper tributary of the Rio Prinzapolka. The climate is very wet and hot, hence the dense tropical rain forest clothing much of the area.

VEGETATION: Lowland tropical rainforest gives way at higher elevations to cloud forest and, in the summit area, elfin cloud forest, which have never been disturbed or exploited. An inventory of the flora is in progress, but no details are yet available. Initial field visits indicate many new species and an extremely diverse flora.

NOTEWORTHY FAUNA: Due to habitat diversity there is a rich fauna, the mammals including the howler monkey *Alouatta villosa* (I), white-throated capuchin *Cebus capucinus*, Central American spider monkey *Ateles geoffroyi* (V), giant anteater *Myrmecophaga tridactyla* (V), ocelot *Felis pardalis* (V), jaguar *Panthera onca* (V), Central American tapir *Tapirus bairdi* (V), white-lipped peccary *Tayassu albirostris*, white-tailed deer *Odocoileus virginianus* and red brocket deer *Mazama americana*. Among the many interesting birds are great tinamou *Tinamus major*, green and scarlet macaws *Ara ambigua* and *A. macao*, parrots *Amazona* spp., the quetzal *Pharomachrus mocinno* (V), keelbilled toucan *Ramphastos sulfuratus* and three-wattled bellbird *Procnias tricarunculata*.

ZONING: None; no resource inventory or management plan yet.

DISTURBANCES OR DEFICIENCIES: Hitherto almost none, but with the increase of population and a steady movement from west to east, farmers practising swidden or shifting cultivation have entered the lowlands bordering the park, and unless the park is properly managed and protected they are likely to trespass over its boundaries within the near future. The new road from the Pan-American highway to Pto. Cabezas on the Atlantic coast passes close to the area. On a recent field trip (February 1979) 51 families were counted with small agricultural holdings near the park's southern border.

SCIENTIFIC RESEARCH: Only initial visits for flora surveys to date.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Neill, D. (1978). La vegetacion del Parque Nacional Cerro Saslaya. Herbario Nacional de Nicaragua, report, 3 pp.

Personal communications: Gutierrez, C. (1978-79); Incer, J. (1978-9); Morales, R. (1979).

STAFF: No personnel have been assigned to the park. The administration of the park is directed from the central offices of the Park Service of IRENA in Nicaragua.

BUDGET: No budget has been allocated.

LOCAL PARK OR RESERVE ADMINISTRATION: Ing. Enrique Cedeno, Director, Park Service, IRENA, Managua, Nicaragua.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(2) Volcan Masaya National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 23 May 1979.

GEOGRAPHICAL LOCATION: 20km southeast of Managua; 11°54'-12°00'N, 86°08'-15'W.

ALTITUDE: 100-635m.

AREA: 5,500 ha.

LAND TENURE: Totally owned by the Government of Nicaragua.

PHYSICAL FEATURES: The area consists of a huge caldera, with two volcanic cones containing a total of three craters, one of which is permanently active. Large lava flows extend over most of the caldera and the flanks of the volcano. On the eastern edge of the park is the large Laguna de Masaya which is the water source for many small towns and villages in the area. The climate is dry tropical; average annual temperature is 25°C and rainfall 1,600mm.

VEGETATION: The flora and vegetation are characteristic of dry tropical forests and savannahs of Nicaragua, but due to the scant, poor soil, hot winds and very dry conditions, the shrubs and trees are more dwarfed, branched and lignified than the same species in other dry forests. The dominant trees are *Enterolobium cyclocarpum*, *Ficus* spp., *Cordia alliodora*, *Bursera simaruba*, *Bombacopsis quinata* and *Acrocomia vinifera*.

NOTEWORTHY FAUNA: The fauna, particularly mammals, is not particularly abundant due to past hunting pressure, but seems to be recovering now.

ZONING: Both detailed management (master) and interpretative plans exist and they are being rapidly implemented (approximately 60% complete at time of writing). The zoning scheme includes i) intangible zone, ii) primitive zone, iii) extensive use zone, iv) intensive use zone, v) special use zone and vi) natural recuperation zone.

DISTURBANCES OR DEFICIENCIES: There are still some problems with firewood collecting and poaching of wildlife (particularly deer), but these are greatly diminished. Small areas formerly grazed by cattle and used for subsistence farms are now recovering. Due to the recent civil war the management and protection activities of the park were stopped for several months, resulting in some invasions of squatters and other disturbances within the park. All these problems are now under control.

SCIENTIFIC RESEARCH: Various studies have been carried out, including many on geology and some on orchids and general flora. A wildlife survey (particularly mammals) and management recommendations have recently been completed.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Atwood, J. (1975). A report on the orchids of Volcan Masaya and the Masaya Lava flow. Dept. bot. Michigan State Univ: mimeo.

Incer, J. (1975). Plan Maestro para el establecimiento y Manejo del Area del Volcan Masaya como Parque Nacional, CATASTRO, UCA, IGN, Banco Central, Nicaragua, 108 pp.

McBirney, A. (1956). The Nicaraguan Volcano Masaya and its Caldera. Trans. Amer. Geoph. Union.

STAFF: A superintendent, a chief warden, 8 guides/park guards and 12 general guards.

BUDGET: US\$ 2,000,000 from Banco Central for 1977-80, and an additional contribution of approximately US\$ 500,000 from Public Works and Agriculture Ministries.

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Reinaldo Arostegui, Superintendent, Volcan Masaya National Park, Banco Central de Nicaragua, Apto. 2252, Managua, Nicaragua.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

PANAMA

AREA: 77,080 sq km.

POPULATION: 1,718,700 (1978).

PARKS AND RESERVES LEGISLATION: Law #12 of 25 January 1975 created the Natural Renewable Resources Directorate and established its general functions in wildlands conservation. Law #39 of September 1966, the General Forestry Law, provides for the declaration of Special Forest Reserves, for scientific, educational, historic, touristic, recreational or other reasons and includes public parks, biological reserves, recreation areas etc. The Torrijos-Carter Treaty on the Panama Canal established the Barro Colorado Natural Monument (BCNM).

PARKS AND RESERVES ADMINISTRATION: Natural Renewable Resources Directorate (RENARE). The Panamanian Institute of Tourism is managing the Portobelo National Park, in collaboration with RENARE. The Smithsonian Tropical Research Institute (STRI) is managing the BCNM.

ADDRESS: (a) Departamento de Parques Nacionales y Vida Silvestre, Direccion General de Recursos Naturales Renovables (RENARE).

(b) Ministerio de Desarrollo Agropecuario (MIDA), Apartado 2016, Panama City, Panama.

(c) Smithsonian Tropical Research Institute (STRI), PO Box 2072, Balboa, Panama.

TOTAL AREA UNDER PROTECTION: 660,902 ha approx.

PROTECTED AREAS:

National Parks	(hectares)
1 Darien (World Heritage Site)	597,000
2 La Amistad (International) (proposed)*	200,000
3 Soberania	22,000
4 Portobelo	17,364
5 Volcan Baru	14,322
6 Altos de Campana	4,816
Natural Monuments	
1 Barro Colorado	5,400
Anthropological Reserve	
1 Comarca San Blas	Unknown

* This area is not included in **TOTAL AREA UNDER PROTECTION**.

(1) Darien National Park

MANAGEMENT CATEGORY: II & X (National Park & World Heritage Site).

BIOGEOGRAPHICAL PROVINCE: 8.2.1 (Panamanian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 7 August 1980, and accepted as a World Heritage Site in 1981.

GEOGRAPHICAL LOCATION: The park is located in the province of Darien; 7°10'-8°30'N, 77°20'-78°20'W.

ALTITUDE: From sea level to 1500m.

AREA: 597,000 ha.

LAND TENURE: Over 90% national land; the rest is occupied for traditional agriculture by Chocoe and Cuna indians.

PHYSICAL FEATURES: This park covers about 80% of the international border between Panama and Colombia. The Pacific tides (from 3.8m to 6.1m) affect the Chucunaque and Tuira rivers for many kilometres inland twice daily. There are beaches, rocky coasts, freshwater marshes and swamps. The mean annual temperature is 26°C, and annual rainfall is 2,500-3,500mm on the Atlantic side and 1,800-2,500mm in the central part of the area and on the Pacific side. There are two groups of indigenous people within the park, the Choco people, and the more traditionally organised Cuna indians.

VEGETATION: The Darien forests have been characterized by scientists as the most diverse ecosystems of tropical America, and they are still relatively undisturbed. The most conspicuous and common species in the area is the 'cuipo' *Cavanillesia platanifolia*. Premontane and montane forest occurs above 200m altitude, and these forests include several types of botanically interesting ecosystems, including cloud forest and the elfin forest of Cerro Pirre. The wetland forest along the Chucunaque and Tuira rivers is often covered by pure stands of 'cativo' *Priona copaiifera*, this species being the most utilized timber tree in the region. There are some mangroves along the Pacific coast, the more common species being *Rhizophora mangle*, *Avicenia nitida*, *Laguncularia racemosa*, *Mora oleifera* and *Pterocarpus officinalis*.

NOTEWORTHY FAUNA: There have been few studies on the fauna. Among the mammals present in the area can be mentioned the bush dog *Speothos venaticus* (V), giant anteater *Myrmecophaga tridactyla* (V), capybara *Hydrochaerus hydrochaeris*, douroucoulis *Aotus trivirgatus*, brown-headed spider monkey *Ateles fusciceps*, ocelot *Felis pardalis* (V) and Baird's tapir *Tapirus bairdii* (V). The harpy eagle *Harpia harpyia* (R) is also found here, as are the crocodilians *Caiman crocodilus fuscus* (V) and *Crocodylus acutus* (E).

ZONING: None yet applied. The Master Plan proposed the following zones: absolute conservation zone, cultural zone (subdivided into cultural conservation sub-zone and active cultural sub-zone) and development zone. It is expected that this will require revision as more detailed ecological, ethnological and socio-economic data are gathered.

DISTURBANCES OR DEFICIENCIES: This area constitutes the only remaining gap in the entire Pan-American Highway, which is under construction and will bisect the park. Precautions and regulations for its potential impact have been taken. The towns of El Real and Boca de Cupoe are very close to the area and the majority of their inhabitants have small farms inside the park. There are very limited areas of agriculture and disturbed forest near the Chocoe and Cuna Indian villages, principally along river courses.

SCIENTIFIC RESEARCH: Only a few studies have been published. These deal mainly with the flora, vegetation and general ecology of the area. The area has not yet been well studied.

SPECIAL SCIENTIFIC FACILITIES: None *per se*, but RENARE has constructed administration/living-quarters in Yaviza, near the park. This is the provisional administrative centre for the park and can receive limited scientific use.

PRINCIPAL REFERENCE MATERIAL: Dalfelt, A. and Morales, R., eds (1978). Plan Maestro para el establecimiento y manejo del Parque Nacional Darién, Panama. RENARE, COPFA, CATIE. 213 pp. IUCN/WWF Project 1648. Proposed Darien National Park.

Morales, R. and MacFarland, C (1979). Plan Operativo para el Parque Nacional Darién, 1979-81. RENARE/CATIE. 35 pp.

Morales, R. and MacFarland, C. eds. (1979). El Manejo conjunto de la zona fronteriza del Darién. Primera Reunion Colombo-Panamena. CATIE, Informe Téc. No. 5 1980. 52 pp.

STAFF: A superintendent and three forest inspectors.

BUDGET: In 1979 US\$ 10,100 from RENARE, US\$ 5,000 from WWF; 1980 US\$ 15,000 RENARE, US\$ 17,000 WWF; 1981 US\$ 20,000 RENARE, US\$ 25,000 WWF, US\$ 10,000 other Panamanian government sources.

LOCAL PARK OR RESERVE ADMINISTRATION: Biol. Ramon Alvarado, National Parks and Wildlife Department, RENARE, Apartado 2016, Ciudad de Panama, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(3) Soberania National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.2.1 (Panamanian).

LEGAL PROTECTION: Total. The recreational areas will be managed by STRI (Smithsonian Tropical Research Institute) and become a National Monument in 1979.

DATE ESTABLISHED: 29 March 1979, by Presidential Decree.

GEOGRAPHICAL LOCATION: The park occupies a major section of the eastern bank of the Panama Canal, and is 2km from Barro Colorado Island; 9°05'-17'N, 79°35'-50'W.

ALTITUDE: 20-200m.

AREA: Approximately 22,000 ha.

LAND TENURE: Government owned land.

PHYSICAL FEATURES: The area is contiguous with several small forested peninsulas (800 ha in total). It is mostly composed of flattish areas and low rolling hills, but with some steep areas of 45°-70°. May-December is a very wet season and January-April is the dry season. Average annual rainfall is probably around 3,500mm, and the average annual temperature about 28°C.

VEGETATION: Primarily covered by mature lowland tropical rainforest (Very Wet Tropical Forest in the Holdridge System), with some sections covered by 60-70 year old secondary growth forest. The flora is estimated at a minimum of 1,500 species.

NOTEWORTHY FAUNA: There is a vertebrate fauna of at least 650 species, 560 of them birds. 20 of those 650 are currently listed as endangered by the US Fish and Wildlife Service and CITES. The highest one-day bird count in the world (333 species) was made in these forests in 1976. A rich invertebrate fauna is expected, but has still been little studied.

ZONING: The Management Plan establishes the following zoning: intangible zone, primitive zone, intensive use zone, extensive use zone, special use zone and recovering zone. The park includes several small Canal Zone settlements and the Summit horticultural gardens with a small zoo and good recreational areas.

DISTURBANCES OR DEFICIENCIES: Over the past 15 years encroachment on the area by 'campesinos' has increased notably, and several thousand hectares at least have been cut and burned for agricultural use. There is extreme danger that this will sharply increase in the future. Illegal hunting is also quite common.

SCIENTIFIC RESEARCH: There has been some research over the years, but nothing extensive. However, the similar forests, fauna and flora of Barro Colorado Island are probably the most extensively studied tropical forests in the world; since 1923, hundreds of scientific studies have been conducted there. Soberania is easily accessible by train and paved road.

SPECIAL SCIENTIFIC FACILITIES: None *per se*; however STRI has extensive facilities on nearby Barro Colorado Island. Some old hunting club facilities in the 'Pipeline Road' area could be renovated for basic research facilities.

PRINCIPAL REFERENCE MATERIAL: Grandi, C., Morales, R. and MacFarland, C. (1980). Plan Operativo Parque Nacional Soberania, 1980-81. CATIE, Turrialba, Costa Rica. 15pp.

Hidalgo, Y., MacFarland, C., and Grandi, C. (1981). Plan de Manejo del Parque Nacional Soberania. RENARE/CATIE. 200 pp.

RENARE (1979). Various personal communications.

STRI (1979). Various personal communications.

US AID (1978). Panama Project Paper: Watershed Management, Dept. of State, AID, Washington DC. 71 pp + 11 annexes.

STAFF: A superintendent, 15 wardens and 10 general workers.

BUDGET: US\$ 500,000-700,000 for 1979-83 as part of Government of Panama (RENARE) - US AID (loan funds) Watershed Management Project.

LOCAL PARK OR RESERVE ADMINISTRATION: Professor Dimas Botello, Director Parque Nacional Soberania, RENARE, MIDA, Apdo. 2016, Panama, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(4) Portobelo National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.2.1 (Panamanian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 22 December 1976, by Legislative Decree #91.

GEOGRAPHICAL LOCATION: This park is located in the Portobelo District, Province of Colon; 9°47'-9°39'N, 79°47'-79°30'W.

ALTITUDE: From sea level to 979m (Cerro Bruja).

AREA: 17,364 ha.

LAND TENURE: 73% national lands, 20% private lands, 7% government farms.

PHYSICAL FEATURES: The area has about 70km of coastline with many bays, islands, mangroves and swampy areas. Historically Portobelo Bay is the most important feature of the park. This site was selected by the Spaniards to build a fortification to defend the port from where gold brought from Peru by land was shipped to Spain. Some remains of this fortification still exist in the area. Some of the ruins of the complex (houses, church, customs building, canons, military fortifications) are well preserved.

VEGETATION: Following the system of Holdridge there are four life zones in the park: 1) Tropical Moist Forest, 2) Tropical Wet Forest, 3) Premontane Wet Forest, and 4) Premontane Rain Forest. Besides the dense and heterogeneous forest existing in the area there are large swampy areas covered by mangroves. The annual precipitation is 4,800mm, and the mean temperature 25.9°C.

NOTEWORTHY FAUNA: Because of the existence of different ecosystems inside the park, a good diversity of species and a healthy population of animals are expected. The several coral formations along the coast indicate a rich marine fauna. The hawksbill turtle *Eretmochelys imbricata* (E) periodically uses the beaches of the park to nest.

ZONING: The zoning recommended in the Management and Development Plan has not been implemented yet. It includes proposals for the following: primitive, extensive use, intensive use, historical-cultural and special use zones.

DISTURBANCES OR DEFICIENCIES: Inside the park there is a human population of approximately 5,000 people, who produce severe disturbances in the park from agriculture, hunting, pollution etc. The colonial fortification ruins are occupied by Portobelo town, causing considerable physical damage to the ruins. Aesthetically, the mixture of beautiful old ruins and modern poorly-constructed houses is not pleasant, nor does it coincide with the purposes of the park.

SCIENTIFIC RESEARCH: A few general surveys of flora, vegetation, fauna and natural resources have been carried out by L.R. Holdridge, G. Budowski and E.C. Webster.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Dalfelt, A., Thelen, K., Tovar, D., Guerra, C. and Sanjur, A. (1975). Plan de Manejo y Desarrollo para el propuesto Parque Nacional Portobelo, Panama. FAO/PNUD/IPAT/ RENARE. 83 pp.

N de la Rosa, G.C. and Varela, C.E. 1977). Caracteristicas socio-economicas de la comunidad de Nuevo Tonosi (Portobelo). RENARE, Panama. 91 pp.

Tovar, D. (1972). Estudio preliminar para el Plan de Manejo del Propuesto Parque Nacional Portobelo, RENARE. Panama.

STAFF: The Panamanian Institute of Tourism (IPAT) and RENARE have approximately 5 guards and 1 social worker in the area.

BUDGET: US\$ 17,290 from RENARE for 1979, plus an unknown amount from IPAT.

LOCAL PARK OR RESERVE ADMINISTRATION: Instituto Panameno de Turismo (IPAT), Panama City, Panama; RENARE, Apartado 2016, Panama City, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(5) Volcan Baru National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.16.4 (Central American).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 24 June 1976 by decree no. 40.

GEOGRAPHICAL LOCATION: In the mountains of western Panama, approximately 15 miles from the Costa Rican border; 8°45'-52'N, 82°29'-37'W.

ALTITUDE: 1,544-3,475m.

AREA: 14,322 ha.

LAND TENURE: Almost all government land, but approximately 15% is occupied by squatters.

PHYSICAL FEATURES: Volcan Baru, the highest mountain in Panama, is situated in the Talamanca Mountains. It is also known as Volcan de Chiriqui. The entire area is of volcanic origin, the mountain being an 'old' eroded volcano. The rocks are mainly andesites and pumice, and there are several crater formations. The climate is sub-tropical, with a wet season (May-December) and a dry season (December-April). Average annual rainfall at 2,000m above sea level is 4,000mm; average annual temperature at the same altitude is 20°C.

VEGETATION: There are two vegetation types identified by the Holdridge system, Premontane Wet Tropical Forest and Montane Wet Tropical Forest. Cloud and elfin forest at higher elevations is spectacular with large numbers of epiphytes. The dominant trees are various oaks, especially *Quercus copeyensis*. 'Llanos' (grassy plains) are found at lower levels on the arid poorly weathered soils of some of the old lava flows. Subalpine plants are common near the park, where the vegetation is of a unique tropical subalpine paramo type.

NOTEWORTHY FAUNA: The park has a very rich avifauna and among notable species are quetzal *Pharomachrus mocinno* (V) and great curassow *Crax rubra*. Notable mammals include collared peccary *Tayassu tajacu*, agouti *Cuniculus paca*, southern coati *Nasua nasua*, puma *Felis concolor* and red brocket deer *Mazama americana*. A number of threatened species have been recorded here in the past, or are likely to be found here, but no recent information was available when this sheet was edited.

ZONING: The Management Plan, including recommendations for zoning and management of surrounding areas, was completed June 1981. The zoning of the park includes intangible, primitive, extensive use, intensive use, recuperation and special use zones.

DISTURBANCES OR DEFICIENCIES: Estimates indicate that approximately 500 families have small agricultural plots inside the park. Clearing of land (deforestation) and fires are a serious and increasing problem. Illegal hunting is common. Overall integral management of the watershed is crucially needed.

SCIENTIFIC RESEARCH: Considerable research on flora and vegetation is being carried out by Missouri Botanical Garden. Avian studies have been done by A. Wetmore and H. Loftin, and a general survey carried out in early 1972 by A. LaBastille. The Management Plan includes an extensive compilation of information on biophysical and socio-economic aspects of the park and surrounding areas.

SPECIAL SCIENTIFIC FACILITIES: None; however, nearby hotels in Boquete and Cerro Punta provide a good logistical base for research in the park. There are numerous trails in the park.

PRINCIPAL REFERENCE MATERIAL: Holdridge, L.R. and Budowski, G. (1965). Report of an ecological survey of the Republic of Panama. *Caribbean Forester* 17: 92-110.

LaBastille, A. (1973). An ecological survey of the proposed Volcan Baru National Park, Republic of Panama. IUCN Occ. Paper No. 6, 77 pp.

MacFarland, C. and Zadroga, F. (1981). Plan de Manejo del Parque Nacional Volcan Baru y Recomendaciones sobre la ordenacion de la region adyacente. CATIE, Turrialba, Costa Rica, 276 pp. + 4 apéndices.

STAFF: A superintendent, 2 inspectors and 2 wardens, all part-time, and with other functions in the province.

BUDGET: US\$ 8,840, in 1979 from the Panamanian Government (RENARE); one of two major Volcan Baru watersheds (Rio Caldera) will receive approximately US\$ 1,000,000 over the next five years as part of the RENARE-US AID Watershed Management Project (GOP and AID financing).

LOCAL PARK OR RESERVE ADMINISTRATION: Sr. Aquilino Sanjur, Director, Parque Nacional Volcan Baru, RENARE, MIDA, Apartado 2016, Panama City, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(6) Altos de Campana National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.2.1 (Panamanian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 April 1977, by law 35.

GEOGRAPHICAL LOCATION: On the Pacific coast, 60 km southwest of Panama City; 8°39'-44'N, 79°49'-57'W.

ALTITUDE: 250-1,034m.

AREA: 4,816 ha.

LAND TENURE: Approximately 65% government land, 35% private holdings (about 300 persons have land inside the park).

PHYSICAL FEATURES: The area is composed entirely of steep slopes (45°-75°) and the base rocks are volcanics and intrusives. The area is one of the major sources of water for the Panama Canal watershed. There is a wet season of 9 months, and a dry season of 3 months; average annual rainfall is 2,700mm, and average annual temperature 21-22°C.

VEGETATION: Premontane Humid Tropical Forest and Montane Tropical Forest (Holdridge system). About 50% of the area is primary forest, the remainder secondary forest, except approximately 500 ha in agricultural use. The most common tree species are *Didymopanax morototoni*, *Tabebuia guayacan*, *Cordia alliodora*, *Swartzia panamensis* and *Bursera simarouba*.

NOTEWORTHY FAUNA: The fauna is relatively abundant. Over 175 species of birds have been recorded for the park. Common mammals include the opossums *Caluromys derbianus* and *Didelphis marsupialis*, the white bat *Diclidurus virgo* and the common vampire bat *Desmodus rotundus*, collared peccary *Tayassu tajacu* and red brocket deer *Mazama americana*. A sizeable population of the golden frog *Atelopus zeteki* exists in the park.

ZONING: The management plan calls for the following zones: 1) intangible zone, 2) primitive zone, 3) extensive use zone, 4) intensive use zone. Zoning has only been slightly implemented.

DISTURBANCES OR DEFICIENCIES: Substantial problems have been caused by forest fires (usually set by local inhabitants) and cutting of forest for agriculture. Illegal hunting is common. These problems are increasing every year.

SCIENTIFIC RESEARCH: Various studies of flora, vegetation and fauna, but the area is still not well studied. Some of the principle papers are by H. Loftin and L.R. Holdridge.

SPECIAL SCIENTIFIC FACILITIES: None. There is a small administrative centre sometimes available for use by scientists.

PRINCIPAL REFERENCE MATERIAL: Morales, R., MacFarland, C. and Chang, R. (1979). Plan Operativo del Parque Nacional Altos de Campana 1979-81. 34 pp.

Tovar, D., Dalfelt, A. *et al.* (1975). Plan de manejo y Desarrollo de Parque Nacional 'Altos de Campana'. RENARE, MIDA, Panama. 48 pp.

STAFF: A superintendent, a technician and 2 labourers.

BUDGET: US\$ 278,713 for 1979-83 as part of the Watershed Management Project (principally Panama Canal Watershed) to be carried out by RENARE (financed by the Government of Panama and US AID loan funds).

LOCAL PARK OR RESERVE ADMINISTRATION: Lic. Camilo Grandi, Jefe del Servicio de Parques Nacionales, RENARE, MIDA, Apartado 2016, Panama City, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

(1) Barro Colorado Natural Monument

MANAGEMENT CATEGORY: I (Scientific Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.2.1 (Panamanian).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Barro Colorado Island has been protected since 1924. The entire monument was established on 1 October 1979.

GEOGRAPHICAL LOCATION: Located in and around one portion of Gatun Lake (Panama Canal); 9°6'-9°11'N, 79°50'-79°48'W.

ALTITUDE: 26-171m.

AREA: 5,400 ha approximately (with a core area of 1,600 ha).

LAND TENURE: 100% government land. Under the terms of the Torrijos-Carter Panama Canal Treaty, the management is placed under the care of the Smithsonian Tropical Research Institute (STRI) at least until 1999.

PHYSICAL FEATURES: Artificial islands, peninsulas and bays produced by the construction of the Panama canal and the consequent creation of Gatun Lake. Annual average temperature at 45m is 28°C and annual average precipitation at 45m is 2500mm.

VEGETATION: Essentially the same as for Soberania National Park: see sheet for that park.

NOTEWORTHY FAUNA: Outstanding number of bird species and other groups of animal life. Essentially the same as for Soberania National Park: see sheet for that park. Including spider monkey *Ateles geoffroyi* (V) (reintroduced in 1961 - free-ranging group now increasing), ocelot *Felis pardalis* (V), margay *F. wiedii* (V), jaguarondi *F. yagouaroundi* (I), otter *Lutra longicaudis*, mantled howler *Alouatta palliata* and Geoffroy's tamarin *Saguinus oedipus* all at stable population level.

ZONING: A very preliminary zoning scheme exists to determine where different types of research (strictly observational, limited, collecting allowed, heavier manipulation) may be conducted. STRI intends to prepare a long term management plan some time during 1981 or 1982.

DISTURBANCES OR DEFICIENCIES: Some small portions of some of the peninsulas (which were added to Barro Colorado Island to form the Monument *per se*) were used for agriculture until October 1979. Those are now in recuperation.

SCIENTIFIC RESEARCH: This area is probably the most intensively investigated (as regards biology and ecology) in the tropics, having been visited and studied by hundreds of biologists for more than fifty years.

SPECIAL SCIENTIFIC FACILITIES: A research station with laboratories, dormitories, houses, a dining hall, small shops, lake transport, etc. for up to 25-30 researchers at a time, is located on Barro Colorado Island. There is an environmental training/education programme.

PRINCIPAL REFERENCE MATERIAL: Management plan. Hundreds of papers have been published on many aspects of the ecology and biology of the fauna, flora, communities etc. of Barro Colorado Island. More limited work has been done on the surrounding peninsulas, in Soberania National Park.

STAFF: A resident director, a chief warden and 6 wardens plus support staff (cooks, secretary, etc.). The scientific facilities on Barro Colorado Island are run by 22 professional staff, 51 mid-level, 13 guards and 30 labourers.

BUDGET: Information not available.

LOCAL PARK OR RESERVE ADMINISTRATION: Dr Ira Rubinoff, Director, Smithsonian Tropical Research Institute. (STRI), PO Box 2072, Balboa, Panama, tel. 52 5539. Ing. Humberto Ocana, Director, BCNM, STRI, PO Box 2072, Balboa, Panama.

NAME OF CNPPA COORDINATOR: Craig MacFarland.

INFORMATION DATED: 15 June 1981.

PARAGUAY

AREA: 406,750 sq km.

POPULATION: 2,804,703 (1977 census).

PARKS AND RESERVES LEGISLATION: The National Forestry Service was created by the forestry law, law 422 of 23 November 1973, and its regulatory Decree 11.681 (6 January 1975) established the Department of Forest Management, National Parks and Wildlife. This Decree also refers to the selection of areas for national park status, their use, management and administration.

PARKS AND RESERVES ADMINISTRATION: This is the responsibility of the Department of Forest Management, National Parks and Wildlife within the National Forestry Service. There are, however, other dependencies in the Ministry of Defence, Institute of Rural Welfare and elsewhere which hold certain responsibilities over the same areas. National Parks are defined as intangible or wild areas in which all utilisation of natural resources is prohibited. National Reserves are areas which are of scientific value because of the natural resources found there. National Protected Forests may have a variety of roles, and may have been established for conservation, watershed protection or even for economic reasons (i.e. price regulation). Wildlife refuges are areas managed for the protection of individual species of groups of species (resident or migratory).

ADDRESS: Servicio Forestal Nacional, Departamento de Manejo de Bosques, Parques Nacionales y Vida Silvestre, Tacuari 443, 4to Piso, Asuncion, Paraguay.

TOTAL AREA UNDER PROTECTION: 1,239,538 ha.

PROTECTED AREAS:

National Parks		(hectares)
1	Defensores del Chaco	780,000
2	Tinfunque	280,000
3	Teniente Encisco*	40,000
4	Caaquazu	6,000
5	Cerro Cora	5,538
6	Ybycui	5,000
7	Salto del Guaira*	900
National Reserve		
1	Kuriy	2,000
2	Cerro Lambaré*	3
Protected Forests		
1	Yakui	1,000
2	Nacunday	1,000

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.

A map of Argentina showing the locations of sampling stations. The map is bounded by a dashed line representing the national border. To the north is Bolivia, to the northeast is Brazil, and to the south is Argentina. A north arrow is located in the upper right corner. Sampling stations are marked with numbered circles (1-7) and triangles (1-2). The stations are distributed across the country, with a higher concentration in the southeast. Station 1 is in the north, station 3 is in the west, station 2 is on the border with Brazil, station 5 is in the northeast, station 7 is on the border with Brazil, station 6 is in the south, and stations 1 and 2 are in the southeast.

A map of Argentina showing the locations of sampling stations. The map is bounded by a dashed line representing the national border. To the north is Bolivia, to the northeast is Brazil, and to the south is Argentina. A north arrow is located in the upper right corner. Sampling stations are marked with numbered circles (1-7) and triangles (1-2). The stations are distributed across the country, with a higher concentration in the southeast. Station 1 is in the north, station 3 is in the west, station 2 is on the border with Brazil, station 5 is in the northeast, station 7 is on the border with Brazil, station 6 is in the south, and stations 1 and 2 are in the southeast.

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Key

- NATIONAL PARKS
- NATIONAL RESERVES
- ◁ PROTECTED FORESTS

(1) Parque Nacional Defensores del Chaco

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: 100 %.

DATE ESTABLISHED: 6 de Julio de 1975 por Decreto No. 16,806.

GEOGRAPHICAL LOCATION: Chaco Boreal; 20°S, 60°30'W.

ALTITUDE: 100 metros promedio sobre el nivel del mar.

AREA: 780,000 ha

LAND TENURE: Propiedad estatal la totalidad del area.

PHYSICAL FEATURES: El Parque Nacional esta ubicado en la region noreste del pais, a una distancia de 830 kilometros por carretera de la capital, Asuncion. La region donde se ubica el Parque se denomina Chaco que constituye una vasta llanura aluvial flanqueada por los rios Paraguay y Pilcomayo, cubierta por bosques bajos y arbustos espinosos. La topografia es plana, la altura es de 100 metros promedio a excepcion del cerro León de 350 metros. Las lluvias se producen con mayor intensidad en los meses de Diciembre a Abril y el promedio anual varia entre 500 y 800mm. La temperatura media anual es de 26°C con altas variaciones extremas, 7°C invierno y 42°C en verano.

VEGETATION: Es de caracter xerofitico y esta constituida por un bosque seco con arboles de madera dura cuya distribucion evita las tierras elevadas por ser éstas demasiado secas. Las especies arboreas mas notables son los quebrachos *Aspidosperma quebracho blanco*, *Schinopsis balansae* (quebracho colorado), tambien abunda el samuhu el palo borracho *Chorisia* sp. el algarrobo *Prosopis* sp., el palo santo *Bulnesia sarmientii*, el guayacan *Caesalpinia paraguariensis*.

NOTEWORTHY FAUNA: El chaco representa una region biogeografica de especiales características y algunas especies destacan por su exclusividad como el Pécari del Chaco *Catagonus wagneri* (V) descubierto para la ciencia solo en 1974 (Wetzel, 1974) y también las aves corredoras Cariamidae *Chunga burmeisteri*. Algunas de los mamíferos mas comunes ademas del *Catagonus* con los pecaries *Tayassu tajacu* y *Tayassu pecari*, el tapir *Tapirus terrestris* también el armadillo de tres bandas *Tolypeutes matacus*, armadillo de nueve bandas *Dasybus novemcinctus* un roedor como la mara *Dolichotis salinicola*, un lagomorpha *Silvilagus brasiliensis*, algunos monos *Aotus trivirgatus* y *Callicebus*, y *Myrmecophaga tridactyla* (V). Carnívoros como el jaguar *Panthera onca* (V), ocelote *Felis pardalis* (V), el puma *F. concolor*, el tigrillo *F. wiedii* (V), y el zorro de monte *Cerdocyon thous*. Entre los anfibios interesantes estan *Lepidobatrachus*, *Ceratiophrys*, y *Phyllomedusa sauvagei* y Reptiles *Bothrops* spp.

ZONING: Existen: i) zona intangible, ii) zona primitiva, iii) zona de uso extensivo, iv) zona de uso intensivo, v) zona de uso especial, vi) zona de recuperacion.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Inventario Biologico Nacional (fauna y flora).

SPECIAL SCIENTIFIC FACILITIES: 1 casa para guardaparque y administracion.

PRINCIPAL REFERENCE MATERIAL: Torres, H. (1978). Conservacion y Manejo de la Fauna Silvestre del Parque Nacional Defensores del Chaco. UNFAO. Doc. de Trabajo No. 2, 6/PAR/6702/T.

STAFF: 1 administrador, 4 guardaparques, 2 empleados.

BUDGET: No especificado, el SFN entrega fondos para alguna necesidades del Parque.

LOCAL PARK OR RESERVE ADMINISTRATION: Silvino Gonzalez, Administrado Parque Nacional Defensores del Chaco, Servicio Forestal Nacional Ministerio de Agricultura y Ganaderia, Asuncion, Paraguay.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: 10 enero de 1980.

(2) Parque Nacional Tinfunke

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: Propiedades privadas forman casi todo el Parque Nacional.

DATE ESTABLISHED: 4 de Marzo de 1966 por Decreto No. 18.205.

GEOGRAPHICAL LOCATION: Departamento Presidente Hayes; 24°30'S, 59°W.

ALTITUDE: 100 metros sobre el mar aproximadamente.

AREA: 280,000 ha.

LAND TENURE: Privada, casi toda la superficie del Parque esta formada por estancias particulares y no hay terrenos estatales.

PHYSICAL FEATURES: El Parque Nacional se encuentra en la region noreste, bordeando la ribera norte del rio Pilcomayo, en un sector que permanece inundado durante todo el ano, dando lugar a la formacion de extensos pantanos. Otro gran sector del parque, lo constituyen vastas llanuras secas de una cubierta vegetal formada por pastos y arbustos. Las lluvias oscilan entre los 500 y los 800 milímetros anuales distribuidos principalmente en los meses de verano y con temperaturas medias anuales de 26°C.

VEGETATION: La vegetacion se caracteriza por la predominancia de una sabana herbacea donde aparecen algunas gramineas, la palma de caranday *Copernicia australis* es la especie forestal mas abundante. En algunos sectores aparecen una densa formacion arbustiva en la que se identifican algunas cataceas y bromeliaceas.

NOTEWORTHY FAUNA: Los mamiferos presentes muestran algunas diferencias respecto a otras unidades de conservacion de la region occidental del pais, destacando una relativa abundancia de carpinchos *Hydrochoerus*, la presencia probable del ciervo de los pantanos *Blastrocerus dichotomus* (V) y del coipo *Myocastor coypus*. También se encuentra el pécari *Tayassu*, el armadillo gigante *Priodontes giganteus* (V), la mara *Dolichotis* y venados *Mazama*. Las aves son abundantes y presentan una gran diversidad de especies, gran parte de los cuales son migratorias y destacan el jabiru *Jabiru mycteria*, el flamenco *Phoenicopterus*, la espatula *Platalea*, el chaja *Chauna torquata*, patos *Cairina* y *Anas*. El reptil de mayor importancia es el yacaré *Caiman*.

ZONING: No hay.

DISTURBANCES OR DEFICIENCIES: El Parque Nacional ha sido creado sobre terrenos de propiedad particular formados por numerosas estancias cuya actividad economica es la ganaderia extensiva de vacunos. El creciente numero de ganado domestico ha traído como consecuencia un abundante contagio a los animales silvestres de enfermedades que causan estragos entre las poblaciones, como la fiebre aftosa y otros. No se conocen los limites del parque y tampoco el numero de estancias que se encuentran dentro.

SCIENTIFIC RESEARCH: No hay.

SPECIAL SCIENTIFIC FACILITIES: No hay.

PRINCIPAL REFERENCE MATERIAL: No hay.

STAFF: No hay.

BUDGET: No hay.

LOCAL PARK OR RESERVE ADMINISTRATION: No hay.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: Enero de 1980.

OBS: Estos informes son tentativos, una vez realizado el viaje al predio del Parque en los meses de Julio-Agosto (1982) se confirmara estos informes.

(3) Parque Nacional Teniente Enciso

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.21.4 (Gran Chaco).

LEGAL PROTECTION: No tiene decreto de creacion oficial.

DATE ESTABLISHED: No hay.

GEOGRAPHICAL LOCATION: Departamento de Nueva Asuncion en la region del Alto Chaco; 22°30' S, 61° 62' W.

ALTITUDE: 100 metros sobre el mar aproximadamente.

AREA: Se ha propuesto 40,000 ha.

LAND TENURE: Propiedad estatal la totalidad del area.

PHYSICAL FEATURES: El parque nacional esta unido a la Capital Asuncion por la carretera Transchaco, las lluvias oscilan entre los 500 y 800 milímetros anuales que se distribuyen entre los meses de Noviembre a Abril. La temperatura media anual es de 26°C. Se ha propuesto una superficie de 23,000 ha, el limite oeste de 23 kilometros corre paralelo a la ruta transchaco, el limite norte y sur son perpendiculares a la misma carretera y se extienden en 10 kilometros, y su limite este tiene la misma longitud del lado oeste configurando un gran rectangulo.

VEGETATION: El tipo de vegetacion orediminante es le bosque xerofilo con un estrato herbaceo de gramineas y numerosas cactaceas y bromeliaceas. Los especies arboreas mas caracteristicas son los quebrachos colorados *Schinopsis*, por lo general asociados con el quebracho blanco *Aspidosperma quebracho blanco*, el palo borracho *Chorisia* y, varias especies de *Prosopis*. Son muy frecuentes dos cactaceas *Opuntia quimilo* y *Cereus coryne* y algunas bromeliaceas espinosas.

NOTEWORTHY FAUNA: Entre los marsupiales encontramos a la zarigueya *Didelphis azarae*, y en los carnivoros al lobo de crin *Chrysocyon brachyurus* (V) uno de los animales mas representativos de la region, al jaguar *Panthera onca* (V), al puma *Felis concolor*, algunos monos, como el aullador *Alouatta*, el mirikina *Aotus trivirgatus*, y el mono de noche *Cebus*. Entre los cérvidos destaca el venado rojo *Mazama americana*, se encuentra también el armadillo gigante *Priodontes giganteus* (V), el oso hormiguero *Myrmecophaga tridactyla* (V). Pero el mamifero de mayor relevancia es el pecari del Chaco *Catagonus wagneri* (V) especie endemica que fue descubierta para la ciencia hace solo unos anos y cuya poblacion es abundante en el propuesto parque nacional. Las aves mas tipicas son las cariamidae *Chunga burmeisteri* y *Cariama cristata*. También se encuentran la charata *Ortalis*, el jabiru *Jabiru mycteria*, garzas *Egretta*, loros *Amazona* y algunos carpinteros *Chrysoptilus*. Los reptiles son diversos y numerosos siendo los principales la tortuga de tierra *Testudo*, las boas *Constrictor*, *Epicrates*, algunas viboras como la cascabel *Crotalus* y *Bothrops*. Los anfibios son también numerosos y hay dos especies endémicas, *Leptodactylus laticeps* y *Ceratophrys pierotti*. Existe un pez pulmonado *Lepidosiren paradoxa*.

ZONING: No hay.

DISTURBANCES OR DEFICIENCIES: Actividades petroleras pasadas han dejado huellas y materiales. Hay caza ilegal pero es pequena la cantidad de denuncias.

SCIENTIFIC RESEARCH: No hay.

SPECIAL SCIENTIFIC FACILITIES: 1 casa para administracion y guardaparques.

PRINCIPAL REFERENCE MATERIAL: Torres, H. (1979). Bases para el desarrollo del Parque Nacional Teniente Enciso con énfasis en sus recursos faunisticos. UNFAO/SFN 6/PAR/6702/T.

STAFF: 1 guardaparque. El ejércoto comparte el control y vigilancia con un pequeno destacamento.

BUDGET: No especificado, el SFN entrega fondos para algunas necesidades del Parque.

LOCAL PARK OR RESERVE ADMINISTRATION: No hay. Contacto con Servicio Forestal Nacional, Ministerio de Agricultura y Ganaderia. Tacuari 443, Piso 3° Asuncion, Paraguay.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: 10 de Enero de 1980.

(4) Parque Nacional Caaquazu

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.8.2 (Brazilian Rain Forest).

LEGAL PROTECTION: 100%.

DATE ESTABLISHED: 23 de Febrero de 1973 por Decreto No. 20.933.

GEOGRAPHICAL LOCATION: Departamento de Caazapa; 26°S, 56°W.

ALTITUDE: 150-480m sobre el mar.

AREA: 6,000 ha.

LAND TENURE: Propiedad estatal la totalidad del area, pero se desafectara 5,000 ha que seran destinadas a explotacion forestal.

PHYSICAL FEATURES: El Parque se halla irrigado por afluentes del rio Parana y rio Paraguay. La superficie del parque es plana en su mayor parte, separadas por cordilleras bien definidas. La precipitacion anual es 1,600mm y la temperature media dea ano 22°-23°C.

VEGETATION: El Parque incluye muchas especies forestales de gran interés economico y de primera calidad entre las que destacan el cedro *Cedrela* sp. y lapacho *Tabebuia* sp.

NOTEWORTHY FAUNA: La fauna ha sido perseguida intensamente y la actividad forestal provoca disturbios en las poblaciones de animales. Las especies mas frecuentes son el coati *Nasua*, el mono *Alouatta* y *Cebus* también el zorro *Dusycion*. Entre los reptiles *Crotalus*, *Bothrops* y lagarto *Tupinambis*.

ZONING: Se ha propuesto: i) zona intangible, ii) zona de recuperacion, iii) zona de uso especial, iv) zona de uso extensivo.

DISTURBANCES OR DEFICIENCIES: Al sur y oeste del parque existen muchas zonas ya alteradas por la agricultura, ganaderia y explotacion forestal. Una casa de guardaparque.

SCIENTIFIC RESEARCH: No hay.

SPECIAL SCIENTIFIC FACILITIES:

PRINCIPAL REFERENCE MATERIAL: Wetterberg, Gary B. (1977). Marco general para planes de manejo para unidades del sistema de parques nacionales paraguayos con aplicacion practica en el Parque Nacional Caaguazu. Doc. de Trabajo No. 15 UN FAO - PAR/72/001.

STAFF: No hay.

BUDGET: No hay.

LOCAL PARK OR RESERVE ADMINISTRATION: No hay.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: 10 de Enero de 1980.

(5) Parque Nacional Cerro Cora

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.30.10 (Campos Cerrados).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 11 de Febrero de 1976 por Decreto 20.698.

GEOGRAPHICAL LOCATION: Departamento de Amambay; 21°30 'S, 61°W.

ALTITUDE: 250-470m sobre el mar.

AREA: 5,538 ha.

LAND TENURE: Propiedad estatal la totalidad del area.

PHYSICAL FEATURES: El area del Parque Nacional se caracteriza por la presencia de cerros aislados y abruptos algunos de los cuales superan los 450 metros, valles de vegetacion baja y numerosos rios y arroyos completan el paisaje. El clima se caracteriza por una precipitacion que oscila entre los 1,200 y 1,600mm aunque existe una marcada estacion seca desde Mayo a Setiembre. La temperatura media anual varia de 21° a 25°C.

VEGETATION: Predominan los bosques alto con arboles de 20 a 30m y sabana con un estrato bajo de hiervas y pastos y estrato superior de palmeras cortas y arbustos bajos, estrato arbustivo importante y otro herbaceo muy rico en leguminosas y gramineas. Destacan el lapacho *Tabebuia*, y el palo rosa *Aspidosperma polyneuron*.

NOTEWORTHY FAUNA: La fauna es muy escasa, pero destacan los marsupiales *Monodelphis* y *Didelphis*, mono *Alouatta*. Algunos carnivoros como el zorro *Dusycion*. También el venado *Mazama americana* y el aguti *Dasyprocta*. Las aves son abundantes y las mas comunes son *Columba*, *Zenaida*, algunas Psitticiformes como *Amazona*, *Forpus* y *Pipile*. Cuculiformes como *Guira guira*, también picaflor *Hylocharis* y algunas rapaces como *Buteo*, *Accipiter* y *Parabuteo*. Los reptiles mas comunes son *Crotalus*, *Bothrops* y el lagarto verde *Ameiva*.

ZONING: Existen: i) zone primitiva intangible, ii) zona primitiva, iii) zona de recreacion intensiva, iv) zone de recreacion extensiva, v) zona historica, vi) zone de recuperacion, vii) zona de uso especial.

DISTURBANCES OR DEFICIENCIES: El Servicio Forestal y el Ministerio de Defensa comparten la administration del parque, faltando coordinacion entre ambos; hay colonos que estan dentro del Parque y sacas de madera.

SCIENTIFIC RESEARCH: Inventario Biologico Nacional.

SPECIAL SCIENTIFIC FACILITIES: No hay.

PRINCIPAL REFERENCE MATERIAL: Plan de Manejo y Desarrollo del Parque Nacional Cerro Cora (en estado de publicacion).

STAFF: 1 administrador, 3 guardaparques y 2 empleados auxiliares.

BUDGET: No especificado, el S.F.N. entrega fondos para algunas necesidades, tambien hay una caja chica del parque.

LOCAL PARK OR RESERVE ADMINISTRATION: Carmelo Rodriguez, Administrador Parque Nacional Cerro Cora, Servicio Forestal Nacional; Ministerio de Agricultura y Ganaderia. Tacuari 443 Piso 4to. Asuncion, Paraguay.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: 10 de Enero de 1980.

(6) Parque Nacional Ybycui

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.6.1 (Madeiran).

LEGAL PROTECTION: 70 per cent.

DATE ESTABLISHED: 16 de Mayo, por Decreto No. 32772.

GEOGRAPHICAL LOCATION: Esta ubicado en el Departamento de Paraguari; 25°30'S, 57°W.

ALTITUDE: 100-400 metros sobre el mar.

AREA: 5,000 ha.

LAND TENURE: Estatal, pero todavia hay algunos colonos dentro del parque que son duenos de su tierra, los cuales son trasladados en etapas a otros sitios indernizandolos por sus tierras.

PHYSICAL FEATURES: El Parque esta ubicado en el Departamento de Paraguari, a 151 kilometros de Asuncion la capital del pais. El area se caracteriza por la presencia de colinas de pendiente suave y por valles con arroyos y vertientes permanentes. Los cursos de agua mas importantes lo forman los arroyos Corrientes y Mina, a los que en su recorrido se agregan otros afluentes. Las colinas mas altas tienen una altura de 350 a 400 metros sobre el mar. La precipitacon promedio anual es de 1,500mm y tiene una estacion mas seca en el invierno y precipitaciones abundantes en el verano. La temperatura media varia entre los 22° a 24°C.

VEGETATION: Esta formado por arboles de 20 a 30 metros de altura, con estratos de arboles menores y un suotobosque denso de bambies y de helechos arborescentes. No se advierten especies dominantes y comparten el terreno una gran diversidad de especies en densidades que varian de lugar a lugar. La superficie del bosque alto tiene 1,000 ha y representa la ultima muestra forestal no alterada totalmente en todo el Departamento de Paraguari. Destacan las especies lapacho *Tabebuia ipe*, timbo *Enterolobium contortisiliquum*, kupay *Copaifera langsdorfii*, Myrtaceae, *Myricaria baporeti*.

NOTEWORTHY FAUNA: Entre los mamiferos destacan el opossum *Monodelphis* y la comadreja *Didelphis*, el capuchin o Kai *Cebus apella*, el mono aullador *Alouatta*, el osito lavador *Procyon cancrivorus*, el coendu *Coendou spinosus*, pecari o kure-i *Tayassu tajacu* y la tamandua *Tamandua tetradactyla*. Entre las aves destacan el Mbigua *Anhinga*, tucan *Pteroglossus ramphastos*. Entre los reptiles, *Bothrops*, *Micrurus*. El pez mas tipico es el dorado *Salminus* que completa su ciclo biologico al llegar al arroyo Corriente dentro del Parque.

ZONING: Existen: i) zona primitiva intangible, ii) zona primitiva, iii) zona de recreacion intensiva, iv) zona de recreacion extensiva, v) zona historica, vi) zona de recuperacion, vii) zone de uso especial.

DISTURBANCES OR DEFICIENCIES: La presencia de colonos dentro del Parque. En un sector del Parque, existen algunos problemas con animales domesticos y practicas de agricultura. Con respecto a la caza algunos colonos cazan para uso de subsistencia (proteina).

SCIENTIFIC RESEARCH: Inventario Biologico (fauna y flora).

SPECIAL SCIENTIFIC FACILITIES: No hay.

PRINCIPAL REFERENCE MATERIAL: Plan de Manejo y Desarrollo Conceptual del Parque Nacional Ybycui. Doc. No. 5 FAO/RLAT/TF/199, 1973.

Plan de Manejo del Parque Nacional Ybycui (en proceso de publicacion).

STAFF: 1 administrador, 2 guardaparques y 4 empleados auxiliares.

BUDGET: No especificado, el SFN entrega fondos para algunas necesidades del Parque, como asi tambien se cuenta de vez en cuando con una caja chica.

LOCAL PARK OR RESERVE ADMINISTRATION: Servicio Forestal Nacional, Departamento de Manejo de Bosques, Parques Nacionales y Vida Silvestre. Tacuari 443 Edificio Patria. Asuncion, Paraguay. Ing, Agr. Miguel A. Martini, Administrador del Parque Nacional Ybycui.

NAME OF CNPPA COORDINATOR: M. Dourojeanni y H. Torres.

INFORMATION DATED: 10 de Enero de 1980.

PERU

AREA: 1,285,215 sq km.

POPULATION: 16,000,000 (1980).

PARKS AND RESERVES LEGISLATION: The two main laws dealing with the establishment and running of protected areas are the Decree Law 21147 of 5 May 1975 (Forestry and Wildlife Law) and the Supreme Decree 160-77-AG of 31 March 1977 (Regulations of units of conservation). Conservation units are also dealt with in the Agrarian Reform Law 17716 (1969) which states that National Parks and Forests, Forest Reserves and archaeological zones declared by law are not to be considered for land distribution under the reform law. Conservation units are considered to be public domain, and hence acquired rights do not exist relative to them. How this applies to some reserves is unclear from our current information.

PARKS AND RESERVES ADMINISTRATION: The Direccion General Forestal y de Fauna of the Ministry of Agriculture was responsible for the usual technical activities of the National Parks administration under Decree Law 19608 (21 November 1972) and managed some of the parks, while the regional organisations of the Ministry were responsible for managing the rest. Since 1981, however, INFOR (Instituto Nacional Forestal y de Fauna) has had responsibility for executive management of the whole national system of conservation units. Of approximately ten different categories of protected area recognised in Peruvian law the present volume contains details of four. The national park is an area intended for protection of its flora, fauna and scenic beauty so that it remains in a completely natural state. National Reserves are areas where wildlife species of national conservation interest are protected. Under some conditions wildlife in these areas can be utilised. National Sanctuaries protect species or communities of certain plants or animals in a natural state. They can also protect natural formations of scientific or landscape interest. Historical Sanctuaries protect in a natural state those areas important in Peruvian history. Other designations include National Forest, Hunting Reserve, Communal Reserve, Fishery Reserve and Protection Forest.

ADDRESS: (a) Direccion General Forestal y de Fauna, Ministerio de Agricultura, Natalio Sanchez 220 (3er. Piso), Lima, Peru.

(b) Instituto Nacional Forestal y de Fauna, Lima, Peru.

REFERENCES: Dourojeanni, Marc and Ponce, Carlos F. (1978). Los parques nacionales del Peru, INCAFO, Madrid.

TOTAL AREA UNDER PROTECTION: 4,295,499 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Manu	1,532,806
2 Huascaran	340,000
3 Cerros de Amotape	91,300
4 Tingo Maria	18,300
5 Cutervo	2,500
National Reserves	
1 Pacaya Samiria	1,387,500
2 Salinas y Aguada Blanca	366,936
3 Paracas	335,000
4 Calipuy	64,000
5 Junin	53,000
6 Titicaca	36,180
7 Pampas Galeras	6,500
8 Lachay	5,070
National Sanctuaries	
1 Huayllay	6,815

2 Calipuy	4,500
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Historical Sanctuaries

1 Macchu Picchu	32,592
2 Chacamarca	2,500
3 Pampa de Ayacucho*	300

Biosphere Reserves

1 Manu	(1,881,200)
2 Huascaran	(399,239)
3 Noroeste	(135,000)

* There is also the Tambopata Natural Wildlife Reserve of 5,500 ha.

* This area is not included in **TOTAL AREA UNDER PROTECTION**.



(1) Manu

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1/8.35.12 (Amazonian/Yungas).

LEGAL PROTECTION: Proteccion total de los ecosistemas.

DATE ESTABLISHED: 29 de Mayo de 1973, mediante Decreto Supremo 0644-73-AG.

GEOGRAPHICAL LOCATION: 71°45'W, 12°00'S. Vertientes orientales de los Andes y Selva baja, principalmente (incluye también porciones de las tierras altas de los Andes). Departamentos de Cuzco y Madre de Dios.

ALTITUDE: 500-4,500 m.s.n.m.

AREA: 1,532,806 ha.

LAND TENURE: Terrenos del estado (grupos nativos migratorios).

PHYSICAL FEATURES: Fisiografia variada desde las tierras altas (punas) hasta la selva baja, plana, pasando por la típica fisiografia abrupta de las yungas. Incluye, principalmente, la cuenca (media y alta) del rio Manu. Debido a su amplia cobertura de ecosistemas los parametros climaticos son amplios: una temperatura media anual de 20°C a 24°C (en la selva baja) hasta 5°C (en las partes mas altas). La precipitacion rankea desde 1,500 mm hasta mas de 8,000 mm. El material geologico pertenece principalmente a las facies continentales sedimentarias.

VEGETATION: La vegetacion es propia de las formaciones bosque muy humedo (prob. la mas grande), bosque pluvial, bosque pluvial semisaturado, y paramo pluvial, en los pisos basal, montano bajo, montano y subalpino de la region latitudinal subtropical y una pequena representacion del bosque muy humedo premontano tropical. En sus bosques muy humedos destaca la presencia de *Swietenia* sp. y *Cedrela* sp. arboles de maderas finas, *Phytelephas macrocarpa* (castano).

NOTEWORTHY FAUNA: Entre su fauna destacan: *Tremarctos ornatus* (V), *Mazama chunyi*, *Priodontes giganteus* (V), *Lutra incarum*, *Panthera onca* (V), *Melanosuchus niger* (E) (todas especies muy raras o vulnerables) [tambien red uakari *Cacajao calvus* (V), *Pteronura brasiliensis* (V) y ocelote *Felis pardalis* (V)]. Su riqueza en aves es también muy grande. *Opisthocomus hoatzin*, *Ara* spp., *Cacicus cela*.

ZONING: Ninguna (plan maestro probable en corto tiempo).

DISTURBANCES OR DEFICIENCIES: Probables interferencias con la prospeccion petrolera en un futuro cercano.

SCIENTIFIC RESEARCH: Varios: sobre *Melanosuchus niger*, aves, primates por parte de universidades extranjeras. Sobre *Pteronura brasiliensis* por la Universidad Nacional Agraria La Molina. Varias antropologicas.

SPECIAL SCIENTIFIC FACILITIES: Estacion biologica en la laguna Cashu. Los puestos de vigilancia también son utilizables. Vehiculos terrestres y acuaticos.

PRINCIPAL REFERENCE MATERIAL: Ruiz, Gustavo (1979). Fundamentos y programa de manejo para uso publico del Parque Nacional Manu. Tesis para optar el titulo de Ingeniero Forestal. UNA La Molina. 183 pp.

STAFF: 3 profesionales, 2 técnicos, 27 guardaparques.

BUDGET: 1979: approx. US\$ 65,000; 1980: US\$ 100,000; 1981: approx. US\$ 160,000.

LOCAL PARK OR RESERVE ADMINISTRATION: ORDEMAD - Parque Nacional Manu, Huayna Capac 146 - Urb. Huanchacc - Cuzco - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(2) Huascaran

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion de los ecosistemas de la cordillera blanca y de los monumentos arqueologicos.

DATE ESTABLISHED: 1 de Julio de 1975 mediante. Decreto Supremo 622-75-AG.

GEOGRAPHICAL LOCATION: Sierra Central del Peru, Departamento de Ancash; 77°18' W, 09°20' S.

ALTITUDE: 3,200-6,768 m.

AREA: 340,000 ha.

LAND TENURE: Tierras del Estado y comunidades campesinas.

PHYSICAL FEATURES: Fisiografia propia de las altas montanas de los Andes. Presencia caracteristica de nevados, los mas altos del Peru, 27 montanas mas altas de 6,000 m, que dan nombre a la cordillera (Cordillera Blanca). El Huascaran, 6,768 m.s.n.m. es la montana mas alta del Peru. La temperatura media anual debe estar alrededor de 3°C (las minimas llegan a -30°C), la precipitacion media anual debe estar alrededor de 884 mm. El material geologico es principalmente formado por los sedimentos pertenecientes al Jurassico superior marino y plutones del Cretaceo Terciario que conforman el batolito andino.

VEGETATION: La vegetacion es propia de las formaciones bosque humedo Montano, en sus partes mas altas, paramo muy humedo Subalpino y de la tundra pluvial Alpino; de la region Tropical (Sistema Holdridge). Destacan los bosques de *Polylepis incana* y *Buddleia* sp. asi como los rodales de *Puya raimondii*.

NOTEWORTHY FAUNA: Mamiferos, *Hippocamelus antisensis* (V), *Tremarctos ornatus* (V), *Vicugna vicugna* (V), *Felis concolor*, entre las de mas importantes. Aves como: *Vultur gryphus*, varias especies de patos, entre ellas *Merganetta armata*.

ZONING: Ninguna oficial (areas preliminares para camping y algunos senderos y senales).

DISTURBANCES OR DEFICIENCIES: Pastoreo realizado por los hanitantes de los alrededores, recoleccion de hielo, basura en las rutas de montanistas y caminantes. Infraestructure de control insuficiente.

SCIENTIFIC RESEARCH: Varias sobre montanas, lagunas y glaciares principalmente.

SPECIAL SCIENTIFIC FACILITIES: 1 albergue (montanistas, eventualmente cientificos).

PRINCIPAL REFERENCE MATERIAL: Ministerio de Agricultura (1974). Informe técnico para establecer los limites provisionales del parque nacional Huascaran. Zona Agraria III. Mimeo. Huaraz.

STAFF: 1 profesional, 3 guardaprques, 1 administrativo, 7 obreros. 1 puesto de vigilancia. Destacamento de la Policia Forestal.

BUDGET: Hasta 1980: 13,000,000 soles (aprox. 40,000 US\$). 1981: 7,000,000 soles (aprox. US\$ 18,000).

LOCAL PARK OR RESERVE ADMINISTRATION: ORDENOR-CENTRO, Direccion Regional Agricultura y Alimentacion - Proyecto Parque Nacional Huascaran - Av. Las Américas s/No - Teléfono 2128 7 2102 Huaraz.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(3) Cerros de Amotape

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.19.4 (Ecuadorian Dry Forest).

LEGAL PROTECTION: Protección total de los ecosistemas y de especies animales y vegetales en vías de extinción, de especies valiosas forestales y de fauna silvestre característica de los bosques del N.O.

DATE ESTABLISHED: 22 de Julio de 1975, mediante Decreto Supremo 0800-75-AG.

GEOGRAPHICAL LOCATION: Costa Norte de Peru, Departamentos de Tumbes y Piura; 80°37' W, 04°05' S.

ALTITUDE: 200-1,613 m.s.n.m.

AREA: 91,300 ha.

LAND TENURE: Tierras del Estado.

PHYSICAL FEATURES: El area es caracterizada por la cadena de cerros conocido como 'Cerros de Amotapes'. Su relieve es muy variado. Su temperatura media anual es de alrededor de 24°C y la precipitación media anual 900 mm. El material geológico pertenece principalmente a las facies marinas sedimentarias del Siluro-devoniano, constituyendo la base del paleozoico. Su litología consiste de esquistos, cuarcitas oscuras y pizarras negras.

VEGETATION: La vegetación es propia de las formaciones monte espinoso, bosque muy seco; tropicales y bosque seco, monte espinoso; Premontano (Sistema Holdridge). Es de destacar la presencia de *Prosopis juliflora* y *Bombax* sp. y *Tillandsia* sp., *Loxopterygiun huasango*, *Capparis angulata* y *Caesalpinia corymbosa*.

NOTEWORTHY FAUNA: Probable ocurrencia de los últimos ejemplares de *Crocodylus acutus*(E), así como: *Iguana iguana*, *Bothrops* sp.; aves como *Vultur gryphus*, *Sarcoramphus papa*, *Burhinus superciliaris* (Huerequeque), *Aratinga wagleri* (loro cabeza roja), mamíferos como *Odocoileus virginianus*, *Tayassu tajacu*, *Felis concolor*, *Eira barbara*, *Sciurus stramineus* y probable ocurrencia estacional de *Felis pardalis* (V) y *Panthera onca* (V).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Pastoreo extensivo, tala y probablemente caza debido a la ausencia de patrullaje. Infraestructura de control muy deficiente.

SCIENTIFIC RESEARCH: Ninguna bajo la administración nacional.

SPECIAL SCIENTIFIC FACILITIES: No tiene.

PRINCIPAL REFERENCE MATERIAL: Brack, A., Rios, M. y Reyes, F. (1973). Evaluación y bases para el establecimiento de un coto de caza y un Parque Nacional en la Cordillera de los Amotapes. Ministerio de Agricultura y Universidad Nac. Agraria. 52 pp. Lima, Peru.

STAFF: Ninguno por la administración nacional. Un destacamento de la Policía Forestal.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria I - Piura, José Olaya 197 - Piura, Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(4) Tingo Maria

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Proteccion del ecosistema y especialmente de *Steatornis caripensis*.

DATE ESTABLISHED: 12 de Mayo 1965, mediante Ley No. 15574.

GEOGRAPHICAL LOCATION: Vertientes orientales de los Andes del Centro, Departamento de Huanuco; 75°59'30"W, 09°16'15"S.

ALTITUDE: 1,500-2,500 m.s.n.m.

AREA: 18,000 ha (estimadas).

LAND TENURE: Tierras del Estado y asentamientos agricolas.

PHYSICAL FEATURES: Fisiografia accidentada, pendientes que en general superan el 40 per cent. Numerosos riachuelos, quebradas y manantiales. Cavernas y/o grutas. Temperatura media anual de aproximadamente 22°C y precipitacion media anual de 3,300 mm. El material geologico pertenece tanto a la facies marina sedimentaria como a la facies continental sedimentaria. En el primer caso del Triasico-Jurasico inferior a medio (grupo pucara), en el segundo caso corresponden al Permiano medio a superior (grupo mitu).

VEGETATION: La vegetacion corresponde al bosque muy humedo subtropical. Por lo menos existen 96 spp. de arboles, 17 spp. de palmeras y 31 spp. de arbustos. Destacan *Cinchona* sp. (cascarilla), *Calycophyllum spruceanum* (capirona negra), *Cedreka fissilis*, *Heisteria pallida* (chuchuhuasi), *Croton* spp. (sangre de grado) y palmas como *Mauritia vinifera*, *Euterpe precatoria*, *Jessenia* sp.

NOTEWORTHY FAUNA: La fauna es reducida en especies y numero. Destacan aves como: *Steatornis caripensis* (guacharo), *Rupicola peruviana* y probablemente *Momotus momota*; mamiferos como *Felis pardalis* (V) y *Felis yagouarundi* (V), muy raros en el area; *Saimiri sciureus*, *Saguinus fuscicollis* y probablemente *Myrmecophaga tridactyla* (V). Tambien *Tremarctos ornatus* (V) (Thornback and Jenkins, 1982).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Interferencias serias por agricultores dedicados al cultivo de cacao, cana y coca. Su tamano es muy pequeno para asegurar la proteccion de los ecosistemas. Infraestructura de control deficiente.

SCIENTIFIC RESEARCH: Algunas relativas a espeleologia, biologia y ecologia en la cueva de las lechuzas (*Steatornis caripensis*).

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Dourojeanni, M. y Tovar, A. (1972). Evaluacion y bases para el manejo del Parque Nacional de Tingo Maria. Universidad Nacional Agraria La Molina. La Molina. 71 pp.

STAFF: 3 obreros (1 caseta de ingreso).

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agrarua XI Huanuco, Paucarbambas/No. Cal y Canto - Huanuco - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(5) Cutervo

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Conservacion de la flora y fauna de la llamada Cordillera de Tarros. Especialmente proteccion de *Streptopelia caripensis*.

DATE ESTABLISHED: 8 de Setiembre de 1961, mediante Decreto Ley 13694.

GEOGRAPHICAL LOCATION: Vertientes Orientales de los Andes del norte, Departamento de Cajamarca; 78°47'00"W, 06°14'00"S.

ALTITUDE: 2,200-3,500 m.s.n.m.

AREA: 2,500 ha.

LAND TENURE: Tierras del estado.

PHYSICAL FEATURES: Fisiografia accidentada propia de la selva alta. Cavernas y riosubterraneo. La temperatura media anual debe estar alrededor de 12°C y la precipitacion media anual alrededor de 1,500 mm. El material geologico pertenece a las facies marinas sedimentarias y volcanico-sedimentarias y pertenece tanto al cretaceo medio a superior como al triasico-jurasico inferior a medio. La primera de ellas esta constituida de calizas de color gris claro a negro, areniscas calcareas y silicosas, conglomerados, etc. La segunda consiste de flujos lavicos y piroclasticos interpuestos conareniscas, lutitas y calizas.

VEGETATION: La vegetacion es propia de las formaciones bosque muy humedo Montano y bosque humedo monyano bajo. Destacan *Chinchona* sp. (cascarilla), *Podocarpus* sp., *Alnus jorulensis* (aliso), *Juglans* sp., etc.

NOTEWORTHY FAUNA: Entre las aves: *Streptopelia caripensis* (guacharo), *Rupicola peruviana*; entre los mamiferos: *Tremarctos ornatus* (V), *Mazama americana*, *Tayassu tajacu* y, probablemente, *Tapirus pinchaque* (V).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Tala de bosques, caza y pastoreo ilegales por parte de los pobladores cercanos. (Cutervo: 5,000 h., Socota: 600 h., San Andrés: 200 h. y Santo Tomas: 600 h.). Su tamano es muy pequeno para asegurar la proteccion de los ecosistemas. Infraestructura de control inexistente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Brack, A. y Vilchez, S. (1974). Informe sobre la situacion actual del Parque Nacional Cutervo. Direccion General Forestal y Caza. 24 pp. + mapas. Lima, Peru.

STAFF: Ninguno.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria IX - Cajamarca, Calle Atahualpa 311 - Cajamarca, Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June, 1981.

(1) Pacaya Samiria Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Proteccion de especies en vias de extincion y aprovechamiento de recursos naturales.

DATE ESTABLISHED: 26 Febrero 1977, mediante Decreto Supremo 06-72-PE.

GEOGRAPHICAL LOCATION: Selva baja en el ambito de la extensa depresion que ocurren entre los rios Marañon y Ucayali, Departamento de Loreto; 74°30'W y 5°00'S.

ALTITUDE: 125-800 m.s.n.m.

AREA: 1,387,500 ha.

LAND TENURE: Tierras del Estado, existen 4 caserios en el area.

PHYSICAL FEATURES: Tierras de selva baja, correspondientes a las cuencas bajas del rio Marañon y rio Ucayali. La temperatura media anual debe estar alrededor de 26°C y la precipitacion total media anual alrededor de 3,000 mm. El material geologico tipico de la facies continental sedimentaria del cuaternario reciente y que estan constituidos principalmente por depositos aluviales y fluviales.

VEGETATION: La vegetacion es propia del bosque humedo Tropical con un bosque de estructura vertical compleja y heterogénea. Destacan: *Ceiba samauma* (lupuna), *Inga* sp. (shimbillo), *Cedrela odorata*, palmeras como *Scheelea* sp. (shapaja) y *Phytelephas macrocarpa* (yarina).

NOTEWORTHY FAUNA: La fauna es muy rica y variada, primates: *Cebus apella*, *Lagothrix* sp., *Saimiri sciureus*, *Saguinus fuscicollis*, *Ateles paniscus*; reptiles: *Caiman sclerops*, *Melanosuchus niger* (E), *Podocnemis unifilis* (V) y *P. expansa* (E), *Testudo denticulata*; mamiferos acuaticos como: *Inia geoffroyensis*, *Sotalia fluviatilis* y *Trichechus inunguis* (V). Aves como: *Anhima cornuta* (camungo), *Pandion haliaetus* (aguila pescadora), etc. y peces como *Arapaima gigas* (paiche).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Presencia de actividades agropecuarias en las zonas limitrofes riberenas (rio Marañon y rio Ucayali). Infraestructura de control deficiente.

SCIENTIFIC RESEARCH: El Proyecto Primates realiza evaluaciones en el area. Varias sobre recursos de aguas continentales, especialmente en *Arapaima gigas*.

SPECIAL SCIENTIFIC FACILITIES: La infraestructura de control puede ser aprovechada (2 puestos de control).

PRINCIPAL REFERENCE MATERIAL: Hofmann, R. y Ponce, C. (1968). La Reserva nacional para Manej de la fauna y la Estacion Regional de Biologia Amazonica Samiria y Pacaya. Fundamentos para su establecimiento. Servicio Forestal y de Caza. Lima, Peru.

STAFF: 2 guardaparques.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: ORDELORETO - Region Agraria XVI - Pebas 350 - Iquitos - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(2) Salinas y Aguada Blanca Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12/8.37.12 (Puna/Southern Andean).

LEGAL PROTECTION: Proteccion del ecosistema para el desarrollo de *Vicugna vicugna*, *Hippocamelus antisensis* y otros. Proteccion de *Polylepis* y paisajes.

DATE ESTABLISHED: 9 de Agosto de 1979, mediante Decreto Supremo No. 070-79

GEOGRAPHICAL LOCATION: 71°16'W, 16°04'S; tierras altas de la sierra sur del Peru, volcanoes, nevados y quebradas. Departamentos de Arequipa y Moquegua.

ALTITUDE: 3,500-5,848 m.s.n.m.

AREA: 366,936 ha.

LAND TENURE: Comunidades campesinas (11 caserios).

PHYSICAL FEATURES: Tierra propia de praderas altoandinas, enmarcadas o cruzadas por imponentes nevados y volcanoes. Relieve, entonces, variado, y debido a ello y a las diferencias de altitud la temperatura media anual rankea entre menos de 3°C y 9°C y la precipitacion total anual media entre 200 y 500 mm. El material geologico pertenece principalmente a las facies continentales sedimentarias, volcanicas y volcanicas-sedimentarias, en el primer caso del terciario inferior-medio y del cuaternario reciente, en el segundo caso del terciario medio a superior y cuaternario.

VEGETATION: La vegetacion es propia de las formacions tundra humeda y tundra muy humeda Alpinas, paramo humedo y matorral desértico Subalpinos y matorral desértico montano; todas de la region Subtropical. Importantes son los bosques de *Polylepis* sp. (Quenoa) y las praderas alto andinas con *Festuca* sp., *Parastrephia* sp., *Astragalus* sp.

NOTEWORTHY FAUNA: Se encuentran *Vicugna vicugna* (V)(1,363 ind. 1980). *Hippocamelus antisensis* (V), *Phoenicopterus ruber*, *Phoenicopterus andinus*, *P. jamesi* y varias otras aves altoandinas.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Actividades agropecuarias tradicionales que deben ser reguladas por el Ministerio de Agricultura. Infraestructura de control deficiente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional. Los censos de especies de la fauna por el Proyecto Especial de Utilizacion Racional de la Vicuna.

SPECIAL SCIENTIFIC FACILITIES: Un local alquilado en la localidad de Imata.

PRINCIPAL REFERENCE MATERIAL: Ministerio de Agricultura Informe Preliminar de Estudios Oficio 28-75-DIFF-SUDREN-ZA-VI-MAG del 26 de Mayo 1975.

STAFF: Ninguno de la administracion nacional; 2 profesionales, 2 guardaparques, 3 obreros del Proyecto Especial de Utilizacion Racional de la Vicuna.

BUDGET: Cubierto por el Proyecto Especial de Utilizacion Racional de la Vicuna (aprox. US\$ 52,000 en el ano 1980).

LOCAL PARK OR RESERVE ADMINISTRATION: Av. Alfonso Ugarte S/N, Edificio Colegio San José, Region Agraria VI - Arequipa - Tel. 24222-90.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1980, updated April 1981.

(3) Paracas Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.24.7 (Pacific Desert).

LEGAL PROTECTION: Proteccion total de especies en peligro de extincion.

DATE ESTABLISHED: 25 de Setiembre 1975 mediante Decreto Supremo 1281-75-AG.

GEOGRAPHICAL LOCATION: 76°15'S, 14°00'S. Desierto costero y area marina circundante. Departamento de Ica.

ALTITUDE: 0-786 m.s.n.m.

AREA: 335,000 ha. 217,594 ha aguas marinas y 117,406 ha tierra firme.

LAND TENURE: Tierras del estado. 2 pequenas caletas de pescadores (215 personas).

PHYSICAL FEATURES: Tierras planas o ligeramente onduladas, los cerros mas elevados hacia el mar, linea de costa abrupta (barrancos) playas pedregosas o arenosas generalmente angostas. 2 islas y numerosos islotes. 2 bahias amplias. Temperatura media anual alrededor de 18.7°C y precipitacion media anual alrededor de 2 mm. Material geologico del carbonifero y depositos recientes del cuaternario.

VEGETATION: Vegetacion practicamente inexistente, pequenas extensiones de *Distichlis spicata* y *Sesuvium portulacastrum* en las cercanias del mar. Vegetacion de 'lomas' muy rala en los cerros mas altos de la Peninsula de Paracas, *Cressa truxilensis*, *Tillandsia* sp., *Spergularia* sp., *Solanum ferreyrae*. Varias especies de plantas acuaticas.

NOTEWORTHY FAUNA: Fauna terrestre muy escasa: *Dusycion sechurae* (zorro de costa) y *Tropidurus peruvianus* (lagartija) principalmente. Fauna de vida marina y aves muy rica: *Arctocephalus australis*, *Otaria flavescens*, *Lutra felina* entre las mas vulnerables. *Chelonia mydas* (E) y *Dermochelys coriacea* (E) entre las tortugas marinas. Aves como: *Phalacrocorax*, *Sula* y *Pelecanus* (aves guaneras), *Spheniscus hobboltii*, *Larosterna inca* y *Phoenicopterus ruber* entre las mas destacables y *Vultur gryphus* entre las mas espectaculares.

ZONING: El Plan Maestro considera: Zona Restrstringida (25 per cent), Zona Recreacion (7 per cent), Zona Primitiva (3 per cent), Zona Servicios (min. 1 per cent) y Zona de Utilizacion Directa (65 per cent). Se ofrece un circuito para automoviles, senderos pedestres, miradores, senales.

DISTURBANCES OR DEFICIENCIES: Interferencias con pescadores por el uso de dinamita, vandalismo por motociclistas en restos arqueologicos, saturacion de las areas recreacionales en ciertas épocas. Infraestructura de control deficiente.

SCIENTIFIC RESEARCH: Sobre aves migratorias, marinas, condor. Arqueologicas. Biologia y ecologia de lobo marinos. Geologia.

SPECIAL SCIENTIFIC FACILITIES: La infraestructura de la administracion puede utilizarse para fines cientificos.

PRINCIPAL REFERENCE MATERIAL: Tovar, A., Rios, M. et al. (1979). Plan Maestro Reserva Nacional de Paracas. Direccion General Forestal y Fauna. UNA La Molina y Cooperacion Técnica de Nueva Zelandia. 29 pp. + anexos + mapas. Lima, Peru.

STAFF: 1 profesional, 2 guardaparques.

BUDGET: 1979: aprox. US\$ 20,000; 1980: aprox. US\$ 29,000; 1981: aprox. US\$ 80,000. La Cooperacion Técnica de Nueva Zelandia ha financiado algunas estructuras.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria VI - Ica - Calle Municipalidad 228 - Ica - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(4) Calipuy Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.37.12 (Southern Andean).

LEGAL PROTECTION: Proteccion de *Lama guanicoe* con fines de manejo racional.

DATE ESTABLISHED: 8 Enero de 1981 por Decreto Supremo 004-81-AA.

GEOGRAPHICAL LOCATION: 78°29'W, 8°34'30"S. Sierra Central del Peru, al norte del rio Santa. Departamento de La Libertad.

ALTITUDE: 800-3,600 m.s.n.m.

AREA: 64,000 ha.

LAND TENURE: Tierras del Estado y de comunidades campesinas (SAIS Libertad No. 18 Calipuy).

PHYSICAL FEATURES: Tierras de los Andes Centrales del Peru, relieve variado, quebradas, rios. Temperatura media anual 11°C y precipitacion media anual 500 mm. El material geologico pertenece principalmente al terciario volcanico indiviso (grupo Calipuy) el que aflora y yace sobre la formacion Huaylas con tope erosionado y cubierto por formaciones del cuaternario.

VEGETATION: La vegetacion pertenece a aquella propia del matorral desértico en los pisos Premontano, montano bajo y Montano y a la estepa Montano (Sistema Holdridge). Destacan: *Verbena clavata*, *Baccharis* sp., *Calliandra exposita* etc.

NOTEWORTHY FAUNA: El area ha sido establecida para la proteccion de *Lama guanicoe*, una especie, hoy, en peligro de extincion, asimismo estan presentes *Tremarctos ornatus* (V) y *Vultur gryphus* ambas en situacion vulnerable.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Existen asentamientos humanos (9 familias), el area es dedicado a la agricultura y pastoreo en aquellas zonas que lo permiten. Infraestructura de control inexistente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Franklin, W. (1975). Guanacos in Peru. *Oryx* XII(2): 191-202.

STAFF: Ninguna por la administracion nacional; 1 guarda y 1 obrero proporcionados por la SAIS.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria III - Las Libertad - Avda. Larco 338 - Trujillo. Teléfono 244711.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(5) Junin Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion de la flora y fauna para su posterior aprovechamiento racional.

DATE ESTABLISHED: 7 de Agosto 1974, mediante Decreto Supremo 0750-74-AG

GEOGRAPHICAL LOCATION: 76°07'30"W, 11°00'S. Terrenos planos inundables, pampa, y el lago de Junin (espejo de aprox. 15,000 ha). Departamentos de Junin y Pasco, en la sierra central del Peru.

ALTITUDE: 4,000-4,125 m.s.n.m.

AREA: 53,000 ha.

LAND TENURE: Tierras de 12 comunidades campesinas.

PHYSICAL FEATURES: Situada en la pampa de Junin, una extensa planicie de la que el lago y sus areas influenciadas cubre una cuarta parte. Su temperatura media anual debe estar alrededor de 4°C y su precipitacion media anual alrededor de 800 mm. El material geologico corresponde a las facies continentales sedimentarias propias del cuaternario reciente.

VEGETATION: En el area inundada: algas macroscopicas, plantas sumergidas y emergentes como *Scirpus rigida* y *Scirpus californicus* (mirme). En las areas inundables: *Distichia muscoides*, *Calamagrostis rigescens*, *Poa* spp., *Stipa ichu*, *Lemna* sp.

NOTEWORTHY FAUNA: Peces: *Orestias* spp. (Challhua), *Pygidium oroyae* (bagres). Anfibios: *Batrachophrynus macrostomus* y *B. brachydactylus*, *Bufo spinulosus*. Aves: *Podiceps taczanowskii* y *P. occipitalis* y *P. chilensis* (zambullidores), *Phoenicopterus ruber*, *Plegadis ridgwayi* (yanavico), *Chloephaga melanoptera*, etc. Mamiferos como *Cavia tschudii*.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Contaminacion de las aguas por relaves de las minas. El lago sufrira un cambio importante en su nivel al desarrollarse el proyecto de transvase de las aguas del rio Mantaro, hacia el Pacifico. Infraestructura de control muy deficiente.

SCIENTIFIC RESEARCH: Varias sobre fauna y flora. Especialmente estudios de impacto ecologico para el proyecto del transvase mencionado.

SPECIAL SCIENTIFIC FACILITIES: La sede administrativa, en el pueblo de Ondores, cuenta con oficina y alojamiento para seis personas.

PRINCIPAL REFERENCE MATERIAL: Dourojeanni, M. *et al.* (1968). Observaciones preliminares para el Manejo de Aves Acuaticas de Lago Junin. En: *Revista Forestal del Peru* II (2) pp. 3-52. Lima.

STAFF: 1 técnico.

BUDGET: No tiene, es manejado por la Subdireccion Forestal y de Fauna de Huancayo.

LOCAL PARK OR RESERVE ADMINISTRATION: Distrito Forestal de Ondores - Ondores - Junin - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(6) Titicaca Scientific Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.47.14 (Lake Titicaca).

LEGAL PROTECTION: Para la utilizacion racional de la flora y fauna y conservacion de sus recursos y paisajes.

DATE ESTABLISHED: 31 de octubre de 1978, mediante Decreto Supremo 185-78-AA.

GEOGRAPHICAL LOCATION: Sector Ramis: 69°45'55"W, 15°18'00"S; Sector Puno 69°56'03"W, 15°44'00"S. Comprende el area de totorales (inundada) y espejo de agua de sectores del norte y centro del lago Titicaca. Departamento de Puno.

ALTITUDE: 3,814 m.s.n.m.

AREA: 36,180 ha. Sector Ramis: 7,030 ha. Sector Puno: 29,150 ha.

LAND TENURE: Al estado.

PHYSICAL FEATURES: El lago de Titicaca es de origen tectonico, aproximadante de la era terciaria, formaba parte, con el lago Poopo, el antiguo lago Bollivian. La temperatura de sus aguas varia entre 9°C y 14°C. En los sectores reservados se encuentran las mejores representaciones de los totorales.

VEGETATION: Vegetacion sumergida: *Elodea potamogeton*, *Nostoc* sp., varias algas; florante: *Lemna* sp. (lenteja de agua) anfibias: *Scirpus totora* y *Scirpus rigida*.

NOTEWORTHY FAUNA: Peces: *Orestias* spp., *Pygidium* sp. (Suche), *Salmo gairdnieri* (introducida). Batracios: *Bufo spinulosus*, *Gastritgeca marsupieta* (rana). Aves: *Phoenicopterus ruber*, *Phoenicoparrus* sp., *Anas* spp., *Fulica* spp., *Lophonetta specularioides*, *Nycticorax nycticorax*, *Podiceps* spp., *Theresticus caudatus*. En la zona de influencia mamiferos como *Cava tschudii*.

ZONING: El Plan Maestro contempla, para el sector Ramis: Zona de Servicios, Zona de Recreacion, Zona de Utilizacion Directa (100 per cent). Para el sector Puno: Zona de Servicios (min. per cent), Zona de Recreacion (2.8 per cent), Zona de Recuperacion (16.4 per cent) y Zona de Utilizacion Directa (80.8 per cent). Infraestructura como centros de visitantes, senales y senderos se encuentrea, planeada, para ser ubicada en las tierras cercanas propiedad de comunidades.

DISTURBANCES OR DEFICIENCIES: Utilizacion excesiva de los totorales. Resistencia de los campesinos a la racionalizacion del uso de la totora que se va contrarrestando con las labores de charlas.

SCIENTIFIC RESEARCH: Principalmente sobre productividad de la totora y calculos de la cosecha anual. Otras sobre batracios.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: UNA La Molina. CEPID. (1979). Plan Maestro Reserva Nacional Titicaca. Centro de Estudios y Proyectos de Inversion y Desarrollo de la UNA. 149 pp + anexos + mapas. Lima, Peru.

STAFF: 2 profesionales, 3 técnicos.

BUDGET: 1980: aprox. US\$ 35,000; 1981: aprox. US\$ 47,000.

LOCAL PARK OR RESERVE ADMINISTRATION: No tiene infraestructura administrativa, depende del ORDEPUNO - Direccion Regional de Agricultura - Jr. Moquegua - Puno - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(7) Pampas Galeras Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion total de *Vicugna vicugna*.

DATE ESTABLISHED: 18 de Mayo de 1967 mediante Resolucion Suprema 157-A.

GEOGRAPHICAL LOCATION: 74°23'W, 14°42'S. Praderas altoandinas. Departamento de Ayacucho.

ALTITUDE: 3,950-4,500 m.s.n.m.

AREA: 6,500 ha.

LAND TENURE: 8 comunidades nativas.

PHYSICAL FEATURES: Tierras ligermente onduladas de los altos andes. Quebradas y rios que se cargan en época de lluvias. Terrenos pedregosos. Temperatura media alrededor de 5°C y precipitacion media anual de 800 mm. El material geologico es fundamentalmente de las facies continentales sedimentarias formado por depositos morrenicos y fluvio-glaciares que se hallan rellenando depresiones y hondonadas constituidas por conglomerados y arcillas, formando las pampas del altiplano.

VEGETATION: El conjunto de la Reserva Nacional esta caracterizado por una estepa de gramineas con grupos aislados de pequenos arbustos y relictos de bosques de *Polylepis subquinquefolia* y *Buddleia coriacea*, estrato bajo tapizado de hierbas. *Festuca dolychophylla*, *Stipa ichu*, *Senecio spinosus*, *Azorella* sp., *Pycnophyllum* sp., *Distichia muscoides*, *Parastrephia lepidophylla*. Son por lo menos 151 especies.

NOTEWORTHY FAUNA: *Vicugna vicugna* (V)(4,415 ind. en 1980), *Vultur gryphus*, *Felis concolor*, *Dusycion culpaeus*, *Felis jacobita* (R), *Ptilosceles resplendens*, *Phalcobaenus albogularis*.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Sobre pastoreo y efectos de una sequia larga (4 anos).

SCIENTIFIC RESEARCH: Varias sobre comportamiento de *Vicugna vicugna*, *Dusycion culpaeus*; sobre las comunidades vegetales y sobre la situacion de los pastizales, principalmente.

SPECIAL SCIENTIFIC FACILITIES: Estacion cientifica, laboratorio, alojamiento, museo de sitio, vehiculos.

PRINCIPAL REFERENCE MATERIAL: Tovar, O. (1973). Comunidades Vegetales de la Reserva Nacional de Vicunas de Pampa Galeras. *Publ. Mus. Hist. Natur. Javier Prado. Serv. B. Bot.*, No. 27, pp. 1-32. Lima.

STAFF: De la administracion nacional: guardaparques 4. Del Proyecto Especial Utilizacion Racional de la Vicuna: 11 profesionales, 4 administrativos y 30 guardaparques.

BUDGET: Del Proyecto Especial Utilizacion Racional de la Vicuna. Presupuesto total del Proyecto 1980: US\$ 622,858.

LOCAL PARK OR RESERVE ADMINISTRATION: Subproyecto Pampa Galeras - PEURV.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(8) Lachay Nature Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.24.7 (Pacific Desert).

LEGAL PROTECTION: Proteccion de la formacion vegetal 'Lomas' la regulacion del pastoreo y la reconstitucion de la vegetacion.

DATE ESTABLISHED: 21 de Junio de 1977, mediante Decreto Supremo 310-77-AG.

GEOGRAPHICAL LOCATION: 77°21'W, 11°22'S. Cerros costeros de baja altitud expuestos a las neblinas procedentes del mar. Departamento de Lima.

ALTITUDE: 100-500 m.s.n.m.

AREA: 5,070 ha.

LAND TENURE: Tierras del estado.

PHYSICAL FEATURES: Relieve variado, cerros, quebradas secas todo el ano. La temperatura media anual debe estar alrededor de 17°C la precipitacion media anual debe ser menor de 100 mm. La fuente principal de agua proviene de la condensacion de la neblina en las hojas de la vegetacion y/o rocas. El material geologico esta formado por rocas plutonicas principalmente que conforman el llamado Batolito de la costa, asi como depositos cuaternarios recientes.

VEGETATION: La vegetacion es resultado de la asociacion atmosférica en las formaciones del desierto y matorral desértico subtropicales. Destacan *Carica candicans*, *Capparis angulata* y *Caesalpineia tinctoria*. En las laderas-orientales: *Armatocereus* sp., y *Opuntia* sp.

NOTEWORTHY FAUNA: La fauna esta representado esencialmente por aves: *Speotyto* sp., es visitante ocasional el condor *Vultur gruphus*, algunos reptiles entre los que destaca *Bothrops picta* (jergon de costa) y mamiferos como *Dusicyon* sp. y *Conepatus rex*. Antiguo residente era *Odocoileus virginianus* el ultimo de los cuales fué cazado en 1931.

ZONING: El Plan Maestro considera: Zona Proteccion I y II (17 per cent); Zona Recuperacion (10 per cent); Zona de Uso Intensivo (3 per cent) y Zona Primitiva (70 per cent). Se cuenta con caseta de ingreso, centro de visitantes, areas de picnic, senderos senalizados, camping es prohibido. Ademas, oficina, carpinteria y almacen.

DISTURBANCES OR DEFICIENCIES: Infiltraciones de ganado vacuno en época de lomas (pastoreo). Infraestructura de control deficiente.

SCIENTIFIC RESEARCH: Varias sobre productividad primaria y captadores de neblina a cargo de universidades nacionales. Programa de reforestacion en ejecucion con especies nativas.

SPECIAL SCIENTIFIC FACILITIES: Las instalaciones de la administracion y de visitantes pueden ser utilizadas por investigadores.

PRINCIPAL REFERENCE MATERIAL: Tovar, A., Rios, M. et al. (1979). Plan Maestro Reserva Nacional de Lachay. Direccion General Forestal y de Fauna, UNA La Molina y Cooperacion Técnica de Nueva Zelandia. 40 pp. + figuras. Lima, Peru.

STAFF: 2 guardaparques, 2 obreros.

BUDGET: No tiene presupuesto. La Direccion General Forestal y de Fauna apoya con su presupuesto. La Cooperacion Técnica de Nueva Zelandia ha financiado algunas estructuras.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion General Forestal y de Fauna - Direccion de Conservacion - Natalion Sanchez 220 (3er. Piso) - Lima - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(1) Huayllay Natural Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion de las formaciones geologicas y recuperacion del ecosistema.

DATE ESTABLISHED: 7 de Agosto de 1974, mediante Decreto Supremo 0750-74-AG.

GEOGRAPHICAL LOCATION: 76°19'W, 10°56'S. Cerros muy erosionados y pradera alto andina en sus faldas. Departamento de Pasco.

ALTITUDE: 4,100-4,543 m.s.n.m.

AREA: 6,815 ha

LAND TENURE: Tierras de 8 comunidades y 1 empresa comunal.

PHYSICAL FEATURES: Cerros de las tierras altas de los Andes Centrales, espectacularmente erosionados, probablemente por el agua o intemperismo. Ubicados hacia el oeste de la llamada meseta de Bombon. El conjunto visto de lejos da la impresion de un gigantesco bosque. La temperatura media anual debe estar alrededor de 5°C y la precipitacion total media anual debe ser 800 mm. El material geologico propio de las facies continentales volcanicas y volcanicas sedimentarias del terciario superior al cuaternario, constituidos por tufos blancos y brechoides, las rocas son blandas y facilmente erosionables.

VEGETATION: La vegetacion es propia del paramo muy humedo subalpino Tropical: el pajonal de puna con *Calamagrostis vicunarium* y *Stipa ichu* ademas de *Plantago rigida* (champa). Algunos arboles de *Polylepis* sp.

NOTEWORTHY FAUNA: Mamiferos: *Lagidium peruanum* (vizcacha), *Conepatus rex* (zorrito) y *Dusicyon culpaeus* (zorro). Aves: *Chloephaga melanoptera* (huallata), *Larus serranus*, *Ptilosceles splendens* (lique lique), *Colaptes rupicola* (gargacha).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Pastoreo por las comunidades. Infraestructura de control inexistente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Buenaventura, M. (1978). Plan Maestro Santuario Nacional Huayllay. Tesis para optar el titulo de Ingeniero Foresta. U.N. Centro. Huancayo.

STAFF: No tiene.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Depende de la Reserva nacional de Junin - Distrito Forestal Ondores, Ondores - Junin - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981

(2) Calipuy Natural Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion total de un rodal muy denso de *Puya raimondii*.

DATE ESTABLISHED: 8 de Enero de 1981 mediante Decreto Supremo 004-81-AA.

GEOGRAPHICAL LOCATION: 78°17'W, 08°20'30"S. Sierra Central del Peru, al norte del Rio Santa, 10 km al norte de la Reserva Nacional de Calipuy, Departamento de La Libertad.

ALTITUDE: 3,600-4,300 m.s.n.m.

AREA: 4,500 ha.

LAND TENURE: Tierras de la SAIS 'Libertad No. 18 Calipuy'.

PHYSICAL FEATURES: Tierras de los Andes Centrales del Peru, relieve cariado, presencia de varias quebradas. Temperatura media anual larededor de 6°C y precipitacion media anual de alrededor de 750 mm. El material geologico pertenece al terciario volcanico indiviso (grupo Calipuy) formado por una potente serie de rocas volcanicas, cubierta por formaciones del cuaternario. At 2,400 m.s.n.m. annual mean temperature is 10°C, rainfall 500 mm.

VEGETATION: La vegetacion pertenece a aquella propia del bosque humedo, en sus partes mas altas y del paramo muy humedo Subalpino, de la region Tropical (Sistema Holdridge). Siemdo de destacar la presencia de lo que se considera el rodal mas denso de *Puya raimondii*, bromeliacea con una altura de alrededor de 10 m. 4,000-5,000 ejemplares).

NOTEWORTHY FAUNA: El area ha sido establecido en funcion basica de la proteccion de la *Puya raimondii* es probable la ocurrencia de *Vultur gryphus* y *Tremarctos ornatus*, (V).

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Actividades tradicionales agropecuarias, principalmente pastoreo, éestas de acuerdo con el Decreto de establecimiento pueden proseguir y pueden ser reguladas por el Ministerio de Agricultura. Infraestructura de Control inexistente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Franklin, W. (1975). Guanacos in Peru. *Oryx* XII(2): 191-202.

STAFF: Ninguna por la administracion nacional, 1 guarda y 1 obrero proporcionados por la SAIA (el mismo asignado a la Reserva Nacional Calipuy).

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria III - La Libertad - Avda. Larco 338 - Trujillo. Telf. 244711.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(1) Macchu Picchu Natural Monument

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: Proteccion total del ecosistema, especialmente de fauna en vias de extincion.

DATE ESTABLISHED: 8 de Enero de 1981, mediante Decreto Supremo 001=81-AA.

GEOGRAPHICAL LOCATION: 72°35'W, 12°12'S. Partes mas altas de las vertientes orientales de los Andes (ceja de selva). Departamento de Cuzco.

ALTITUDE: 1,452-3,600 m.s.n.m.

AREA: 32,592 ha.

LAND TENURE: 4 predios (Mandorpampa, Quente, Torontay y S, Rita-Quente).

PHYSICAL FEATURES: Relieve accidentado, cuenca alta del rio Urubamba, la temperatura media anual debe estar alrededor de 16°C y la precipitacion total media anual entre 1,500 y mas de 3,000 mm. El material geologico es caracteristico de facies marinas sedimentarias y plutones. En el primer caso propios del ordoviciano constituido por esquistos, pizarras y cuarcitas y, en el segundo propios del cretaceo-terciario. At 2,500 m 10.2°C, 2,171.3 mm rainfall.

VEGETATION: La vegetacion es propia del bosque humedo y del bosque muy humedo montano bajo de la region Subtropical, asi destacan: *Weinmania* sp., *Podocarpus* sp., *Phragmites* ep., *Ocotea* sp., *Nectandra* sp., *Cecropia* sp., helechos: *Cyathea* sp. y palmeras: *Geromoina* spp., *Cedrela* sp., *Guasca* sp., *Riupala* sp., *Polylepis* spp., *Puy raimondii*.

NOTEWORTHY FAUNA: La fauna es muy interesante: *Tremarctos ornatus* (V), *Mazama chunyi*, *Rupicola peruviana*, *Lutra incarum*, *Mustela frenata*, *Felis colocolo* y *Felis pardalis* (V), *Boa* spp., *Vultur gryphus* etc.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Deforestacion por tala; las estructuras de la central hidroeléctrica de Macchu Picchu son demasiado contrastantes. Infraestructura de control inexistente. Grazing and agriculture.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Un pequeno museo de sitio que podria servir.

PRINCIPAL REFERENCE MATERIAL: Plan COPESCO 1974. Centro de Servicios del Parque Nacional Macchu Picchu. 114 pp.

STAFF: No tiene.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria IX, Cuzco, Matara 394 - Cuzco, Peru, Teléfono 2970-63.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(2) Chacamarca

MANAGEMENT CATEGORY: V (Protected Landscape).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion del escenario de la batalla de Junin. Se regulan las actividades tradicionales.

DATE ESTABLISHED: 7 de Agosto de 1974, mediante Decreto Supremo 0750-74-AG.

GEOGRAPHICAL LOCATION: 75°58'W, 11°12'30"S, pampas de Junin, Departamento de Junin.

ALTITUDE: 4,000-4,125 m.s.n.m.

AREA: 2,500 ha.

LAND TENURE: Comunidades campesinas de Chichausiri.

PHYSICAL FEATURES: Tierras planas de los altos Andes, las pampas de Junin que forman parte de la meseta de Bombon. La temperatura media anual alrededor de 5°C y la precipitacion total media anual alrededor de 800 mm. El material geologico al cuaternario reciente siendo depositos morrenicos y fluvio glaciares que se hallan rellenando depresiones y hondonadas, constituyendo las pampas del Altiplano, el material es formado de conglomerados y arcillas.

VEGETATION: La vegetacion es propisa del paramo muy humedo subalpino tropical y es el tipico pajonal de puna: *Calamagrostis* sp., *Festuca* sp., *Stipa* sp., *Distichia muscoides*, *Plantago rigida*, *Hypochoeris* sp., *Gentiana prostata*, etc.

NOTEWORTHY FAUNA: La fauna mas importante. *Cavia tschudii*, *Dusicyon culpa*, *Ptilosceles resplendens*, *Attagis gayi*, *Nothoprocta pentlandi*, *Conopatus rex*, *Lagidium peruanum*, *Theristicus caudatus*, *Plegadis ridgwayi*, *Chloephaga melanoptera*.

ZONING: Ninguna

DISTURBANCES OR DEFICIENCIES: No existe infraestructura de control, depende de la Reserva Nacional de Junin. Actividades agropecuarias tradicionales que debe regular el Ministerio de Agricultura.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno. Depende de la Reserve Nacional de Junin.

PRINCIPAL REFERENCE MATERIAL: Dourojeanni, M. (1968). El Lago de Junin como centro de un circuito turistico por las provincias de Huarochiri, Canta, Junin y Pasco. *Revista Forestal del Peru* II (2): 53-68. Lima.

STAFF: Ninguno.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Depende de la administracion de la Reserva Nacional de Junin. Distrito Forestal Ondores - Ondres, Junin - Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(3) Pampa de Ayacucho

MANAGEMENT CATEGORY: V (Protected Landscape).

BIOGEOGRAPHICAL PROVINCE: 8.36.12 (Puna).

LEGAL PROTECTION: Proteccion del escenario de la Batalla de Ayacucho. Se regulan las actividades tradicionales.

DATE ESTABLISHED: 14 de Agosto de 1980, por Decreto Supremo 199-80-AA.

GEOGRAPHICAL LOCATION: 74°06'30"W, 13°01'52"S. Departamento de Ayacucho. Sierra Sur del Peru.

ALTITUDE: 3,250-3,800 m.s.n.m.

AREA: 300 ha.

LAND TENURE: Tierras del estado y de la comunidad campesina.

PHYSICAL FEATURES: Tierras altas del Peru, temperatura media anual 13°C y precipitation media anual de 750 m. Tierras planas en las faldas del cerro Condorcunca. El material geologico pertenece al volcanico Ayacucho (terciario) superior el que constituye una facie volcanica posterior a la fase de plegamiento del Mioceno tardio.

VEGETATION: Vegetacion de pradera altoandina: *Stipa ichu*, *Calamagrostis* sp., *Poa* sp., *Plantago* sp., *Ephedra americana*, *Trifolium amabile* y *Alchemilla pinnata*, principalmente.

NOTEWORTHY FAUNA: En situacion indeterminada: *Tinamotis pentlandi*, *Nothura maculosa*, *Nothoprocta ornata*, *Nothoprocta pentlandi*, *Falco sparverius*, *Phalcobaenus albogularis*, *Vanellus resplendens*, *Thinocorus orbignyeanus*.

ZONING: Ninguna.

DISTURBANCES OR DEFICIENCIES: Actividades agropecuarias tradicionales que debe regular el Ministerio de Agricultura. Infraestructura de control inexistente.

SCIENTIFIC RESEARCH: Ninguna bajo la administracion nacional.

SPECIAL SCIENTIFIC FACILITIES: Ninguno.

PRINCIPAL REFERENCE MATERIAL: Ministerio de Agricultura. Informe 056-80-DC-DGFF del 17 de Abril de 1980.

STAFF: Ninguno.

BUDGET: No tiene.

LOCAL PARK OR RESERVE ADMINISTRATION: Region Agraria XVI - Ayacucho - Subdireccion Forestal y de Fauna - Avenida 28 de Julio No. 622 - Ayacucho - Telf. 2124.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: June 1981.

(1) Manu Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.5.1/8.35.12 (Amazonian/Yungas).

LEGAL PROTECTION: Manu National Park was established in 1973 by Supreme Decree 644-73-AG, and is fully protected. Manu National Forest was established by Supreme Resolution 442-1973, and the rational use of timber is permitted.

DATE ESTABLISHED: January 1977.

GEOGRAPHICAL LOCATION: Located in the provinces of Manu and Paucartambo, in the departments of Madre de Dios and Cuzco respectively. The area is bounded on the north and east by the Divortium Aquarum, separating the catchment basins of the Rivers Piedras and the Camisea from the River Manu. It also includes the Manu National Forest, the left bank of the River Alto Madre de Dios and the Atalaya-Tres Cruces highway. 11°19'-13°02'S, 71°07'-72°26'W.

ALTITUDE: 240-4000m.

AREA: 1,881,200 ha.

LAND TENURE: Both Manu National Park and Manu National Forest are state property. The area between the National Park, the National Forest and the left bank of the River Alto Madre de Dios is state property which can, following negotiation, be made over to the Agrarian Sector (Agrarian Reform, etc.).

PHYSICAL FEATURES: Contains the ecological formations of the Andes, and nearly all the ecological formations of eastern Peru: humid forest, humid subtropical forest, very humid subtropical forest, and very humid low mountain forest, with their respective flora and fauna; consequently this area is the most exclusive and representative in the Amazon basin. The biosphere reserve includes the whole of the hydrographic catchment area of the River Manu and part of the catchment area of the River Alto Madre de Dios. In the tropical humid forest the average annual temperature is 24°C and the rainfall is between 2,000 and 2,500mm. In the subalpine humid formations, the average temperature is from 3° to 6°C, and the annual precipitation 1,000mm (Tosi's classification, 1960).

VEGETATION: As the reserve extends from the Andes to the Amazon, its ecology is extremely varied. The following species are regarded as the most important: cedar, mahogany, capirona, cético, lupuma, quinilla. There are also numerous species of palms, grasses, shrubs and epiphytes.

NOTEWORTHY FAUNA: There is an interesting contrast between the species living in the high mountains and those living in the plains. Among the most important are the following: anteater, wolf ('lobo de río'), tigrillo, jaguar *Panthera onca* (V), coloured deer, sachavaca, grey deer, twelve species of primates, boa, black lizard, white lizard, numerous species of snakes including vipers, and a total of 422 species of birds including royal condor, sparrowhawk, macaw, cashew bird, herons, owls and the jabiru stork. The indigenous fishes are well represented in the rivers.

ZONING: The area of the reserve containing the National Forest and part of the National Park constitutes the core zone; the buffer zone comprises the area of land traditionally used for agriculture and stock-raising.

DISTURBANCES OR DEFICIENCIES: The catchment basin of the River Manu is one of the few forest areas unaffected, or very little affected, by man. Only in the buffer zone have activities such as timber felling and hunting been carried out by the local communities.

SCIENTIFIC RESEARCH: Studies conducted at the Coscha Cashu and Panahua Biological Station have been concerned with wildlife, as well as the indigenous Machiguenga community living in the park (bio-anthropological studies). Studies should be intensified for the purpose of evaluating natural resources for their adequate management. In addition, the protection of the National Park will allow comparative studies with zones modified by man.

SPECIAL SCIENTIFIC FACILITIES: At present, there are no scientific facilities available, but the Sierra zone is relatively accessible, being only six hours by road from Cuzco. However, the distance to the lower forest zone by outboard motor boat requires 16 hours (2 days).

PRINCIPAL REFERENCE MATERIAL: Grimwood, J.R. (1971). Proposition de limites definitivos del Parque Nacional del Manu.

Hofmann, R. and Ponce del prado, C. El Gran Parque Nacional del Manu. Informe no. 17, Ministerio de Agricultura, Lima.

Ruiz, Pereyra, G., Alvarez, E. and Agreda, S. (1974). Informe de viaje al Parque Nacional del Manu. Universidad Nacional Agraria, La Molina.

STAFF: Manu National Park has 3 permanent technicians, 8 service helpers and 17 control officers.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Ministerio de Agricultura, Direccion General de Forestal y de Fauna.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: Compiled from material supplied by Unesco.

(2) Huascaran Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.35.12/8.37.12 (Yungas/Southern Andean).

LEGAL PROTECTION: Huascaran National Park has no legal basis as a Biosphere Reserve. It was established by decree D.S. AG-622-75-AG under the law on forests and wildlife D.L. no. 21147.

ALTITUDE: 2500-6768m.

AREA: 399,239 ha in total; 340,000 ha in the Huascaran National Park; 39,590 ha in the northern modified zone; 19,460 ha in the southern modified zone; 189 ha in the Predio Luna modified zone.

LAND TENURE: The majority of the National Park belongs to the State. It contains five properties conceded to the SAIS Atusparia and seven farming communities. The northern modified zone is entirely occupied by farming concerns, while the southern is occupied by small graziers.

PHYSICAL FEATURES: The Cordillera Blanca, the highest tropical mountain range in the world, has 27 snow-capped peaks 600m above sea level, internationally famous for mountaineering. There are deep ravines with rushing torrents formed from rivers and glaciers, 48 lagoons containing more than one million cubic metres of water, and 30 glaciers. The lowest points in the reserve are in the Grand Cataract near the northern boundary; the highest point is the peak Huascaran South.

VEGETATION: The following plant formations are found in the reserve: nival, alpine fluvial tundra, very wet subalpine paramo and wet mountain forest. *Puya raimondii* is abundant. Other plants include Bromeliceae, mountain orchids (*Orchis*, *Masdevakua*), relict forests of *Polylepis* spp. and *Gynoxys* spp.

NOTEWORTHY FAUNA: The spectacled bear *Tremarctos ornatus* (V), puma *Felis concolor incarum*, mountain cat *Felis colocolo pajeros*, white-tailed deer *Odocoileus virginianus* and the vicuna *Vicugna vicugna* (V) are important indigenous species. All of these have been heavily hunted. Among the birds the most noteworthy are the cordillera hawk *Buteo poecilochrous*, the condor *Vultur gryphus* and the giant hummingbird *Patagonia gigas peruviana*.

ZONING: The Huascaran National Park serves as core area and the modified zones buffer.

DISTURBANCES OR DEFICIENCIES: Permanent human settlement is not possible because of the severe climate and difficult topography. The area is only used periodically for pasturing. There is a small mining industry which is proving increasingly uneconomic. The main changes have been caused by the ravages of fires in clearing land for pasture, the litter left by mountaineering expeditions and by intensive hunting of the spectacled bear, vicuna and white-tailed and other deer.

SCIENTIFIC RESEARCH: Research has been conducted on the geography, glaciology, flora and fauna of the area. Studies are needed of energy flow (primary productivity) and the population dynamics of various species. Landscapes and archaeological sites also need to be restored. A feasibility study should be carried out on the possibility of opening the Huascaran National Park to the public.

SPECIAL SCIENTIFIC FACILITIES: Accommodation in the form of refuges is available along certain lagoons and ravines in the park, administered by Electro Peru or the Ministry of Agriculture.

PRINCIPAL REFERENCE MATERIAL: Egeler, A. and De Booy, T. (1956). Geology and Petrology of the Southern Cordillera Blanc, Peru. Netherlands.

Kinzl, H. and Schneider, E. (1950)/ Cordillera Blanca. Innsbruck, Austria, 178pp.

Llosa, F. (1972). Ruella 10-Chavin-Huaylas. Asociacion de Artes y Estudios Experimentales, Lima, Peru. 96pp.

Ponde del Prado, C. (1971). Resumen de los Parques Nacionales y Reservas Equivalentes del Peru. DGFC, 51pp.

Slaymaker, River C. and Rourke, M. Informe Técnico para establecer los limites provicionales del Parque Nacional-Huascaran.

Weberbauer (1945). El Mundo Vegetal de los Andes Peruanos. Ministry of Agriculture, Lima. 766pp.

Yauri, M. (1972). Ancash o la Biografia de la inmortalidad. Lima, 189pp.

STAFF: 1 director, 1 technical assistant, 2 rangers, 2 patrol men, 1 driver, 1 secretary.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Ministerio de Agricultura Zona III, Huaraz, Oficina Parque Nacional Huascaran.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: Compiled from material supplied by Unesco.

(3) Noroeste Biosphere Reserve

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.19.4 (Ecuadorian Dry Forest).

LEGAL PROTECTION: Amotape Hills National Park was established by Supreme Decree 0800-75-AG and is fully protected. El Angolo Hunting Preserve was established by Supreme Resolution 0164-75-AG, and rational use of fauna is permitted. Tumbes National Forest was established by Supreme Decree 007-8-7-57, and the rational use of timber is allowed.

DATE ESTABLISHED: January 1977 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: In the departments of Tumbes and Piura on the north coast of Peru, bordering on the frontier of Ecuador and including the massif of the Amotape or Brea hills; 3°24' -6°22'S, 79°12' -81°20'W.

ALTITUDE: 200-1,613m.

AREA: 226,300 ha including Cerros de Amotape National Park (91,300 ha), El Angolo Hunting Preserve (65,000 ha), and Tumbes National Forest (70,000 ha).

LAND TENURE: All state property.

PHYSICAL FEATURES: The biosphere reserve embraces the mountain range known as the Amotape or Brea Hills, broken by the River Tumbes. There are also temporary streams, with pools that last throughout the dry period. The average annual temperature is 25°C and average annual rainfall 400mm. There are lithosols on the slopes and sandy soils on the lower hills and plains.

VEGETATION: There are relicts of dry forests in the north-east, with species of silk-cotton tree *Ceiba*, lignum vitae, cedars, lion's ear, Cactaceae, Bromeliaceae and Orchidaceae. This area also has the only mangrove swamps in Peru.

NOTEWORTHY FAUNA: Typical fauna of the Amazon and the Pacific province are found in the reserve, along with species endangered at the regional and national level. These include jaguar *Panthera onca* (V), ocelot *Felis wiedii* (V), howler monkey and machin blanco, sloth, wild cat, grey deer, coloured deer, coypu *Hydrochoerus hydrochoeris*, Andean condor *Vultur gryphus*, royal condor, parrots, turkey hens and many other endemic species, American crocodile and boa.

ZONING: The National Park, being fully protected, represents the core zone, with the National Forest and Hunting Preserve forming the buffer zone.

DISTURBANCES OR DEFICIENCIES: Most the whole of the area remains relatively undisturbed by man. The lower area in the west has been affected by timber felling, hunting and extensive grazing.

SCIENTIFIC RESEARCH: This is the only area in Peru where the flora and fauna of dry forests can be studied. The main topics for research are the ecology and conservation of dry forest fauna, primates of the north-west, reproduction and restocking of the American crocodile, the carob tree plantation ecosystem, the management of species for afforestation of devastated areas, and effects of grazing by goats on dry areas.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Brack, A., Rios, M. and Reyes, F. (1973). Evaluacion y Bases para el establecimiento de un Coito de Caza y un Parque Nacional en la Cordillera de los Amotapes. Ministry of Agriculture, Lima.

Chapman, F.M. (1926). The Distribution of Bird-Life in Ecuador. *Bull. Amer. Mus. Nat. Hist.* 55: 784.

STAFF: There is a staff of 14 for the protection and management of the reserve.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Zona Agraria 1 - Piura, Ministerio de Agricultura, Piura, Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: Compiled from material supplied by Unesco.

(1) Tambopata Natural Wildlife Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.35.12 (Yungas).

LEGAL PROTECTION: No information.

DATE ESTABLISHED: 1977.

GEOGRAPHICAL LOCATION: About 40km south of Puerto Maldonado near the confluence of the Rio la Torre and Rio Tambopata, Madre de Dios Province; 12°50'S, 69°25'W.

ALTITUDE: Averages 260m.

AREA: 5,500 ha.

LAND TENURE: Government land, but managed by a private company with tourist interests.

PHYSICAL FEATURES: The reserve is on the east bank of the Tambopata River, with small streams 3-5m below the adjacent land, and old meanders perhaps 10m below the adjacent levées. Further upstream is a series of low remnant hills.

VEGETATION: Subtropical moist forest, with one of the commonest trees being the brazil nut *Bertholletia excelsa*. The levées and hills support impressive, species-rich forests with some trees over 40m tall. The flatlands between streams have scattered trees and an abundance of bamboo.

NOTEWORTHY FAUNA: An exceptionally rich bird fauna (533 species) including six macaws and ten parrots (Psittacidae), eight toucans (Ramphastidae) and the swallow-tailed kite *Elanoides forficatus*. Other species of note include the giant river otter *Pteronura brasiliensis* (V), jaguar *Panthera onca* (V) and black caiman *Melanosuchus niger* (E), and evidence has been seen of the bush dog *Speothos venaticus* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: No information.

SCIENTIFIC RESEARCH: Two biologists/naturalists are paid all expenses and given accommodation in return for acting as guides.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Provided by the managing company, Peruvian Safaris.

BUDGET: Provided by the managing company.

LOCAL PARK OR RESERVE ADMINISTRATION: Peruvian Safaris, Explorer's Inn, via Puerto Maldonado, Madre de Dios, Peru.

NAME OF CNPPA COORDINATOR: M. Dourojeanni.

INFORMATION DATED: August 1981.

PUERTO RICO

AREA: 8,897 sq km.

POPULATION: 3,319,000 (1977).

PARKS AND RESERVES LEGISLATION: Conservation units in Puerto Rico would be established under the relevant United States legislation. National Parks and other categories of lands within the National Park system would be established by individual acts of Congress, except National Monuments which could be created by the President on Federal lands, by proclamation under the authority of the Antiquities Act of 8 June 1906. The National Park Service was established by the act of 25 August 1916. State Parks and Reserves are established under separate state legislation.

PARKS AND RESERVES ADMINISTRATION: Administrative and regulatory authority over the National Parks system is delegated to the National Parks Service through the Secretary of the Interior by the act of 25 August 1916 and subsequent acts of Congress (as set forth in Title 16, Code of Federal Regulation). The National Wildlife Refuges are administered by the US Fisheries and Wildlife Service, which is also responsible to the US Department of the Interior. The forests are the responsibility of the Puerto Rico Forest Service, Department of Natural Resources, under Puerto Rico's forest law 133 of 1 July 1975. The Secretary of Natural Resources, under authority of law 23 of June 1972 and law 70 of May 1976, has the responsibility of developing hunting regulations as well as protecting and enhancing wildlife in the Commonwealth of Puerto Rico.

ADDRESS: of the main offices are given, but Puerto Rican offices exist.
 (a) Director, National Park Service, US Department of the Interior, Washington DC 20240, USA.
 (b) Division of Refuge Management, US Fish and Wildlife Service, 18th and C Streets NW, Washington DC 20240, USA.
 (c) Forest Service, US Department of Agriculture, South Building, Room 4238; Washington DC 20013, USA.

PROTECTED AREAS: 430

National Wildlife Refuges	(hectares)
1 Culebra	284
2 Cabo Rojo*	238
3 Desecheo	146
Biosphere Reserves	
1 Luquillo Experimental Forest	(11,340)
2 Guanica State Forest	(4,015)

* This area is not included in **TOTAL AREA UNDER PROTECTION**.

(1) Culebra National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 27 February 1909.

GEOGRAPHICAL LOCATION: All the islands surrounding the main island of Culebra, Puerto Rico, except Cayo Norte; 18°20'N, 65°20'W.

ALTITUDE: 5-145m.

AREA: 284.1 ha.

LAND TENURE: Approximately 17 small islands or cays, all of volcanic origin, make up the Culebra Refuge. Most of the islands are hilly and have limited vegetation; some are barren rock. The mean temperature is 27°C.

VEGETATION: Subtropical dry forest. Only remnants of the original native forest remain due to overgrazing and bombing. Some coastal scrub, low shrubs, grasses, sedges, mangroves and cactus species are present.

NOTEWORTHY FAUNA: Sooty terns *Sterna fuscata*, brindled terns *Sterna anaethetus*, brown boobies *Sula leucogaster* l., magnificent frigatebirds *Fregata magnificens rothschildi*, red-billed tropicbirds *Phaethon aethereus* and white-tailed tropicbirds *Phaethon lepturus* nest on the refuge islands. Endangered brown pelicans *Pelecanus occidentalis*, hawksbill turtle *Eretmochelys imbricata* (E), leatherback turtle *Dermochelys coriacea* (E), loggerhead *Caretta caretta* (V) and green turtle *Chelonia mydas* (E) are also present.

ZONING: Rural and agricultural.

DISTURBANCES OR DEFICIENCIES: Illegal poaching.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Danforth, Stuart T. Supplementary Account of the Birds of the Virgin Islands including Culebra and Adjacent Islet pertaining to Puerto Rico, with notes on their food habits. *Jour. Agric. UPR*.

Kepler and Kepler (1978). The Sea Birds of Culebra and its Adjacent Islands, Puerto Rico. The Living Bird.

Other reference material available at Refuge headquarters.

STAFF: None on site - administered through Cabo Rojo NWR.

BUDGET: Funded under Cabo Rojo NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, Caribbean Islands NWR, PO Box 510, Boqueron, Puerto Rico 00622.

NAME OF CNPPA COORDINATOR: R. Milne

INFORMATION DATED: 26 January 1981

(2) Cabo Rojo National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 3 June 1974.

GEOGRAPHICAL LOCATION: In the extreme southwest of Puerto Rico; 67°10'N, 17°95'W.

ALTITUDE: 0-18m.

AREA: 237 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: The refuge is upland in character, lying along a low coastal plain with a few gently rolling hills overlooking the southwest point of Puerto Rico. Soils are clay and sandy. The climate is hot and dry with a mean temperature of 27°C.

VEGETATION: Characterized by a mesquite *Prosopis juliflora* savanna with palo verde *Parkinsonia aculeata*, ucar *Bucida buceras* and guayacan *Guaiacum officinale*. One rare tree occurring on the refuge is the violet tree *Polygala cowellii* and *Corinella pauciflora* is an uncommon shrub. Other plants include *Tephrosia cathartica*, *T. cinerea*, *Verbesia encelioides*, *Desmanthus virgatus* and *Ipomoea indica*.

NOTEWORTHY FAUNA: Birds commonly found on the refuge are the smooth-billed ani *Crotophaga ani*, greater Antillean grackle *Quiscalus niger*, American kestrel *Falco sparverius*, red-tailed hawk *Buteo jamaicensis*, hooded mannikin *Lonchura cucullata*, yellow-faced grassquitte *Tiaris olivacea* and the yellow-shouldered blackbird *Agelaius xanthomus* (V), which has an estimated population of 20 birds.

ZONING: Rural and agricultural.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: Space for storage and/or scientific studies.

PRINCIPAL REFERENCE MATERIAL: Reference material is available at the refuge headquarters.

STAFF: Two full-time staff and two youth programmes (five year-round and 12 summer employees).

BUDGET: Approximately US \$80,000 per year.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, Caribbean Islands National Wildlife Refuges, Refuge Manager, PO Box 510, Boqueron, Puerto Rico 00622. Location: Carr. 301, Km 5.4, Corozo, Cabo Rojo, Puerto Rico.

NAME OF CNPPA COORDINATOR: R. Milne

INFORMATION DATED: January 1981

(3) Desecheo National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 19 December 1912.

GEOGRAPHICAL LOCATION: 20km west of Puerto Rico in the Mona Passage. 18°23'N, 67°29'W.

ALTITUDE: Sea level to 208m.

AREA: 145.7 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: The refuge is an extremely rugged and rocky volcanic cone that rises abruptly from deep ocean waters. The shorelines are rocky with few short, narrow beaches, and rise as cliffs or as very steep slopes to several peaks. There is no available water supply on the island as the climate is hot and dry.

VEGETATION: The typical vegetation is seasonal deciduous woodland dominated by gumbo limbo *Bursera simaruba* and a thorny cactus scrub including *Opuntia* spp., *Harrisia postoricensis* and *Mammillaria nivosa*, except for the coastal communities, where there are succulent shrubs and an occasional grassy area of *Panicum maximum* or *Aristida* sp.

NOTEWORTHY FAUNA: There are three endemic species of reptiles: *Anolis deseichensis*, *Ameiva deseichensis* and *Sphacredactylus levinsi*. The brown booby *Sula leucogaster*, red-footed booby *Sula sula* and magnificent frigatebird *Fregata magnificens* nest on the island.

ZONING: Rural and agricultural.

DISTURBANCES OR DEFICIENCIES: Predation upon seabird colonies by Rhesus monkeys; illegal poaching.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Morrison and Menzel. Adaptation of a Free-ranging Rhesus Monkey Group for Division and Transplantation. Wildlife Monographs, Nov. 1972.

Woodbury, Martorell and Garcia. The Flora of Desecheo Island, Puerto Rico. *Jour. Ag. UPR-LV-4-71*.

More information available at the Cabo Rojo Refuge headquarters.

STAFF: Administered from Cabo Rojo NWR.

BUDGET: Funded under Cabo Rojo NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, Caribbean Islands National Wildlife Refuges, Refuge Manager, PO Box 510, Boqueron, Puerto Rico 00622.

NAME OF CNPPA COORDINATOR: R. Milne

INFORMATION DATED: January 1981

(1) Luquillo Experimental Forest (Caribbean National Forest)

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: The area is managed by the United States Forest Service (USFS) as both a National Forest and Experimental Forest and is protected from hunting and from large scale habitat disturbance.

DATE ESTABLISHED: June 1976.

GEOGRAPHICAL LOCATION: Located within the Luquillo Mountains of eastern Puerto Rico, approximately 35km east of San Juan. 18°21'N, 65°45'W.

ALTITUDE: 150-1080m.

AREA: 11340 ha. (largest tract of contiguous ownership on the island).

LAND TENURE: Publicly owned (federal) area. Private inholdings total 50 ha.

PHYSICAL FEATURES: The topography is mountainous and six major river systems begin in the mountains. Waterfalls and cascades are common. Soils are generally acid clays, and four soil series (Los Guineos, Rough Stoney Land, Yunque, and Guayabota) comprise 70% of the area. Often these soils are shallow and/or stoney and are not suitable for cultivation. Above 600m, soils are frequently saturated. The climate is warm and wet. On foothills and slopes below 600m, annual precipitation is 1760-2500mm, mean temperature above 15°C. On peaks and high ridges above 800m, precipitation exceeds 3700mm and temperature averages 19°C. Weather data available in Briscoe (1966).

VEGETATION: The park contains the largest remnant of undisturbed forest vegetation of several forest types. Four vegetation types are generally recognized. On the lower elevations, the lower montane rainforest (Beard, 1944) or the subtropical wet forest (Holdridge, 1947; Ewel and Whitmore, 1973) is found. This is the most diverse forest; it contains 3 strata, and the emergent stratum is up to 35m. Shrubs and herbs are unimportant. *Dacryodes excelsa* is the dominant tree; *Sloanea berteriana* and *Manilkara bidentata* are other prominent species. The montane thicket (Beard) or the subtropical rainforest (Holdridge) is found in the valleys and gentle slopes above 600m elevation. This type has two strata and a canopy layer less than 15m; Colorado *Cyrilla racemiflora* is the dominant tree. The palm brake (Beard), Sierra palm *Euterpe globosa*, is associated with unstable soils. The elfin woodland or dwarf forest is a unique forest at the highest elevations. The tree canopy varies from 6m in height to less than 1m on the most exposed peaks. Trees are festooned with mosses and epiphytes. Details of biotic and abiotic environment available in Wadsworth (1951).

NOTEWORTHY FAUNA: The diversity of birds within the forest is relatively low; a checklist of breeding birds prepared for the National Forest contains only 35 species. The Puerto Rican parrot *Amazona vittata* (E) is the only parrot native to US territory still extant. Fewer than 25 parrots remain in the wild, and all are found in the Caribbean National Forest. An intensive research and management effort is underway to save the species. Bats are the most common and conspicuous mammal. Other mammals found within the Forest are the introduced Indian mongoose *Herpestes mungo*, the black roof rat *Rattus rattus*, the wharf rat *R. norvegicus* and feral cats *Felis catus*. The Puerto Rican boa *Epicrates inornatus* has not been well studied and little is known of its habitat requirements, distribution, and life history.

ZONING: Within the forest, 2800 ha are designated for timber management, 2330 ha designated as research tracts. Special areas include the Bano de Oro Research Natural Area, a 745 ha tract of virgin rain forest representing the major forest types in which only non-destructive research activities are allowed and long-term protection is the goal. The buffer zone includes areas devoted to timber management and recreation.

DISTURBANCES OR DEFICIENCIES: The core of the National Forest represents original Spanish Crown land and was never inhabited. The Natural Area is within this zone and thus serves as an undisturbed baseline community. The fringe areas of the forest were subjected to farming or timber removal. Following purchase, these areas were planted and silviculture is now being practised. Recreation is a major activity within the forest, but almost all of the estimated 1,000,000 visitations were in the road corridors and in a single 15 ha picnic area.

SCIENTIFIC RESEARCH: The USFS has conducted research within the forest since 1932, with many results published in the *Caribbean Forester*. Other significant research includes the Atomic Energy Commission (now ERDA) and the Nuclear Centre of the University of Puerto Rico programme of ecological research begun in 1963 and including the El Verde radiobiology project (reported by Odum and Pigeon, 1970). A modified programme continues with emphasis on hydrological research. Research in the dwarf forest was conducted by the Arnold Arboretum of Harvard University (e.g., Howard, 1968). At the Institute of Tropical Forestry (ITF) a new programme of research in the natural forest was begun in 1975. Proposed research includes studies of productivity, stand development, impacts of timber harvest on residual stands and recovery of stands following harvest, and ecological life histories of tree species.

SPECIAL SCIENTIFIC FACILITIES: The El Verde Field Station provides a permanent base with easy access for research in the Luquillo Mountains. Both laboratory and housing are available. Laboratory and office space, a nursery and workshop are available at ITF headquarters in Rio Piedras.

PRINCIPAL REFERENCE MATERIAL: Beard, J.S. (1944). Climax vegetation in tropical America. *Ecology* 25: 127-158; Briscoe, C.B. (1966). Weather in the Luquillo Mountains of Puerto Rico. ITF Research paper 3; Ewel, J.J. and Whitmore, J.L. (1973). The ecological life zones of Puerto Rico and the US Virgin Islands. Forest Service Research Paper ITF-18; Holdridge, L.R. (1947). Determination of world plant formations from simple climatic data. *Science* 105: 367-368; Howard, R.A. (1968). The ecology of an elfin forest in Puerto Rico. 1. Introduction and composition studies. *Jour. Arnold*

Arboretum 50: 225-267: Odum, H.T., Pigeon, R.F. (Eds.) 1970. A tropical rainforest: a study of irradiation and ecology at El Verde, Puerto Rico. USAEC, TID-24270: Wadsworth, F.H. (1951). Forest management in the Luquillo Mountains. I. The setting. *Caribbean Forester* 12(3): 93-114.

STAFF: ITF research staff, 7 scientists and 10 support personnel.

BUDGET: No Information.

LOCAL PARK OR RESERVE ADMINISTRATION: Director, Institute of Tropical Forestry, PO Box AQm Rio Piedras, Puerto Rico 00928.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: Derived from information supplied by Unesco.

(2) Guanica State Forest

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.40.13 (Greater Antillean).

LEGAL PROTECTION: Under the provisions of administrative bulletin no. 5 of 22 December 1919, Governor Arthur Yager assigned 2078.9 ha to create the original Guanica Forest Reserve. In subsequent years more lands were acquired by various means, adding the balance to make up the 4,015.5 ha which today comprises the total area of the reserve.

DATE ESTABLISHED: 22 December 1919 as a forest reserve.

GEOGRAPHICAL LOCATION: Located on the southwestern coast of Puerto Rico, about 30km west of Ponce; 17°55'30"N, 67°05'W.

ALTITUDE: Sea level to 228m.

AREA: 4,015 ha.

LAND TENURE: The forest is publicly owned by the Commonwealth of Puerto Rico. The Puerto Rico Land Authority holds title to 942 ha, but these are managed by the Department of Natural Resources which owns the remaining land.

PHYSICAL FEATURES: Include mangroves and beaches. A man-made cave of historical value is located near Camp Borinquen in the forest's eastern segment.

VEGETATION: Eight plant associations have been described for the Guanica Forest (Lugo *et al.*, 1978). The upland associations consist of a deciduous forest (2345.7 ha), a semi-evergreen forest (718.2 ha) and a scrub forest (581.4 ha). The saline and beach associations consist of mangrove (25.9 ha), salt flats (9 ha) and beach and headland thicket (85.5 ha). Human or disturbed associations consist of plantations (31.1 ha) and savannas (55.6 ha). The more structurally complex forest types are the deciduous and semi-evergreen forests, although transitions from one type to another are gradual. The tallest trees in Guanica are found in the semi-evergreen forest. The most abundant tree species in the deciduous forest are *Exostema caribbaeum* and *Pisonia albiia* which together account for about 70% of the basal area. Succulent plants, mainly cacti, grow at lower elevations, where exposed limestones become virtually the only substrate for plant growth. Over 700 species of plants have been reported for the Guanica Forest. Of these, 246 are trees, 48 are considered rare or endangered and 16 are only found within the forest boundaries.

NOTEWORTHY FAUNA: According to Kepler and Kepler (1970), the diversity of birds in the Guanica Forest is greater than that in the Luquillo National Forest. Total bird density in Guanica is also greater. Nine of Puerto Rico's 14 endemic bird species occur in Guanica Forest. These are the Puerto Rican lizard cuckoo, the Puerto Rican emerald hummingbird, the Puerto Rican tody, the Puerto Rican woodpecker, the Puerto Rican flycatcher, the Puerto Rican vireo, the Puerto Rican bullfinch, the yellow-shouldered blackbird and the Puerto Rican whippoorwill. The latter two are endangered species. The forest also supports an important herpetofauna that includes such rare and endemic forms as *Amieva wetmori* and *Anolis cooki*. Two specimens of the extremely rare Puerto Rican toad *Bufo lemur* were taken from the

forest in 1975. Two species of bats, *Antibeus jamaicensis* and *Brachyphylla cavernarum*, occur in a cave located within the forest's boundaries. This cave is the only known habitat on the main island of Puerto Rico for two cave adapted aquatic invertebrates, *Typhlata monae* and an eyeless *Stygiomysius* shrimp.

ZONING: Little information, about 30 ha of the forest consists of plantations (mainly *Swietenia mahogani*). The road and trail system consists of approximately 57km.

DISTURBANCES OR DEFICIENCIES: For the past 50 years the Guanica Forest has been protected from such activities as charcoal cutting, goat grazing and subsistence farming. During the late 1930s and early 1940s the Civilian Conservation Corps built nearly all of the existing buildings, roads and trails. There are five permanent structures of significant size, including an office building and the forest ranger's residence. Recreational facilities consisting of several concrete and wood structures are located at Cana Gorda, Tamarindo and Jaboncillo beaches. Typically, but not exclusively, the Guanica Forest serves the recreation needs of people living in eight nearby municipalities - a combined population total of over 330,000 people.

SCIENTIFIC RESEARCH: No information.

SPECIAL SCIENTIFIC FACILITIES: These are presumably available, but we have no information.

PRINCIPAL REFERENCE MATERIAL: Not listed.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Not available.

NAME OF CNPPA COORDINATOR: R. Milne

INFORMATION DATED: 1981.

ST LUCIA

AREA: 616 sq km.

POPULATION: 121,469 (1978).

PARKS AND RESERVES LEGISLATION: Forest, Soil and Water Conservation Ordinance, Chapter 25, 1 June 1946. A National Parks Ordinance is in preparation. The St Lucia National Trust of 1975 is presumably also relevant.

PARKS AND RESERVES ADMINISTRATION: The St Lucia Forestry Division is responsible for managing the reserves.

ADDRESS: Forestry Division, Ministry of Agriculture, Castries, St Lucia.

TOTAL AREA UNDER PROTECTION: 1,600 ha.

PROTECTED AREAS:

Nature Reserve		(hectares)
1	St Lucia	1,600
Forest Reserves		
1	Castries Water Works*	1,208
2	Quillesse*	854
3	Ve—Vottier*	200
4	De Suze Estate*	108
5	Dennerly*	148

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.

(1) Castries Water Works Forest Reserve

MANAGEMENT CATEGORY: Unknown.

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1946.

GEOGRAPHICAL LOCATION: North central portion of the island, about 7km southeast of Castries; 14°0'N, 60°56'W.

ALTITUDE: 170-700m.

AREA: 1,208 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Very steep slopes of the central mountainous portion of the island. Provides water for the town of Castries.

VEGETATION: Montane and lower montane rainforest with *Dacryodes-Sloanea* associations dominant.

NOTEWORTHY FAUNA: Semper's warbler *Leucopseza semperi* (E) and the iguana *Iguana iguana*.

ZONING: The area is zoned for selective felling.

DISTURBANCES OR DEFICIENCIES: Squatters have entered the area and cleared isolated patches for agricultural use.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Forest Management Plan for St Lucia.

STAFF: 1 forest guard and 1 forestry assistant, both part-time.

BUDGET: Guard salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 24 July 1979.

(2) Quillesse Forest Reserve

MANAGEMENT CATEGORY: Unknown.

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1946.

GEOGRAPHICAL LOCATION: More or less at the centre of island, 18km south of Castries; 13°51'N, 60°59'W.

ALTITUDE: 200-944m.

AREA: 854 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Primary and secondary rain forest. Mountainous terrain of volcanic origin.

VEGETATION: Primary and secondary rainforest with *Dacryodes-Sloanea* associations dominant, cloud forest, several species of rare orchids.

NOTEWORTHY FAUNA: St Lucia parrot *Amazona versicolor* (E), St Lucia black finch *Melanospiza richardsoni*, rufous-throated solitaire *Myadestea genibarbis*, St Lucia oriole *Icterus laudabilis*.

ZONING: The area is partially zoned for strict protection and partially for selective felling.

DISTURBANCES OR DEFICIENCIES: Some areas have been logged by selective felling.

SCIENTIFIC RESEARCH: Research on St Lucia parrot.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: St Lucia Forest Management Plan.

STAFF: A forest assistant and a forest guard.

BUDGET: Staff salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 24 July 1979.

(3) Ve-Vottier Forest Reserve

MANAGEMENT CATEGORY: Unknown.

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1946.

GEOGRAPHICAL LOCATION: Close to the island's centre, about 20km south of Castries; 13°51'N, 60°58'W.

ALTITUDE: 200-613m.

AREA: 200 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Mountainous terrain of volcanic origin.

VEGETATION: Primary and secondary rainforest with *Dacryodes-Sloanea* associations dominant.

NOTEWORTHY FAUNA: St Lucia parrot *Amazona versicolor* (E), rufous-throated solitaire *Myadestes genibarbis*, St Lucia black finch *Melanospiza richardsoni* and St Lucia oriole *Icterus laudabilis*.

ZONING: Zoned for strict protection and selective felling.

DISTURBANCES OR DEFICIENCIES: Some squatters are in the area.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: St Lucia Forest Management Plan.

STAFF: A forest assistant and a forest guard.

BUDGET: Staff salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 24 July 1979.

(4) De Suze Estate Reserve

MANAGEMENT CATEGORY: Unknown.

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1946.

GEOGRAPHICAL LOCATION: Central west St Lucia, about 21km south of Castries; 13°50'N, 60°57'W.

ALTITUDE: 200-612m.

AREA: 108 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Primary and secondary rainforest (see Castries Water Works Reserve). Mountainous terrain of volcanic origin.

VEGETATION: Primary and secondary rainforest with *Dacryodes-Sloanea* associations dominant.

NOTEWORTHY FAUNA: St Lucia parrot *Amazona versicolor* (E), rufous-throated solitaire *Myadestes genibarbis*, St Lucia black finch *Melanospiza richardsoni* and St Lucia oriole *Icterus laudibilis*.

ZONING: Zoned for selective felling.

DISTURBANCES OR DEFICIENCIES: Squatters occupy small portions of the reserve.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: St Lucia Forest Management Plan.

STAFF: A forest guard part-time and a forest assistant part-time.

BUDGET: Staff salaries.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 24 July 1979.

(5) Dennery Forest Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1946.

GEOGRAPHICAL LOCATION: Central eastern portion of island, about 13km southeast of Castries; 13°55'N, 60°55'W.

ALTITUDE: 70-353m.

AREA: 148 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Steep terrain around Mount Beaujolais to the east of the central mountains.

VEGETATION: Primary and secondary evergreen and semi-evergreen forest; primary rainforest.

NOTEWORTHY FAUNA: St Lucia oriole *Icterus laudabilis*.

ZONING: This area is zoned for strict protection.

DISTURBANCES OR DEFICIENCIES: The area has experienced some clearing for agriculture in the past, but this has been stopped.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: St Lucia Forest Management Plan.

STAFF: A forest guard part-time and a forest assistant part-time.

BUDGET: Salaries of staff.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 24 July 1979.

ST VINCENT

AREA: 389 sq km.

POPULATION: 113,000 (1979)

We have no information on the current situation in St Vincent.

REPUBLIC OF SURINAME

AREA: 163,820 sq km.

POPULATION: 391,000 (1978)

PARKS AND RESERVES LEGISLATION: The first game sanctuary was established by Resolution in 1953 based on the Police Penal Ordinance of 1942. But the principles of nature conservation were first formulated and embodied into law in the Nature Protection Ordinance of 1954 (GB No. 26) and provide the legal basis for establishment of nature reserves by Resolution. The Forest Ordinance of 1947 also allows for the establishment of Forest Reserves.

PARKS AND RESERVES ADMINISTRATION: The Forest Service of the Ministry of Development has a Nature Conservation Department, which is responsible for running the parks and reserves. The Chief Conservator is assisted by the Foundation for Conservation of Nature in Suriname (STINASU), a private non-governmental organization. Nature reserves are established on public lands, which, in the opinion of the advisory commission, are of scientific, aesthetic or cultural value. These may not necessarily be sites of exceptional interest, but will include sites which are regarded as representative samples of landscape or vegetation types.

ADDRESS: (a) Forest Service, PO Box 436, Paramaribo, Suriname.
(b) STINASU, PO Box 436, Paramaribo, Suriname.

REFERENCES: Augustinus, P.G.L. (1978). The Changing Shoreline of Suriname.

Schultz, J.P. (1968). Nature Preservation in Suriname - a review of the present status. Suriname Forest Service, Paramaribo, PO Box 436.

Schultz, J.P., Mittermeier, R.A. and Reichart, H.A. (1977). Wildlife in Suriname. *Oryx* XIV(2): 133-144.

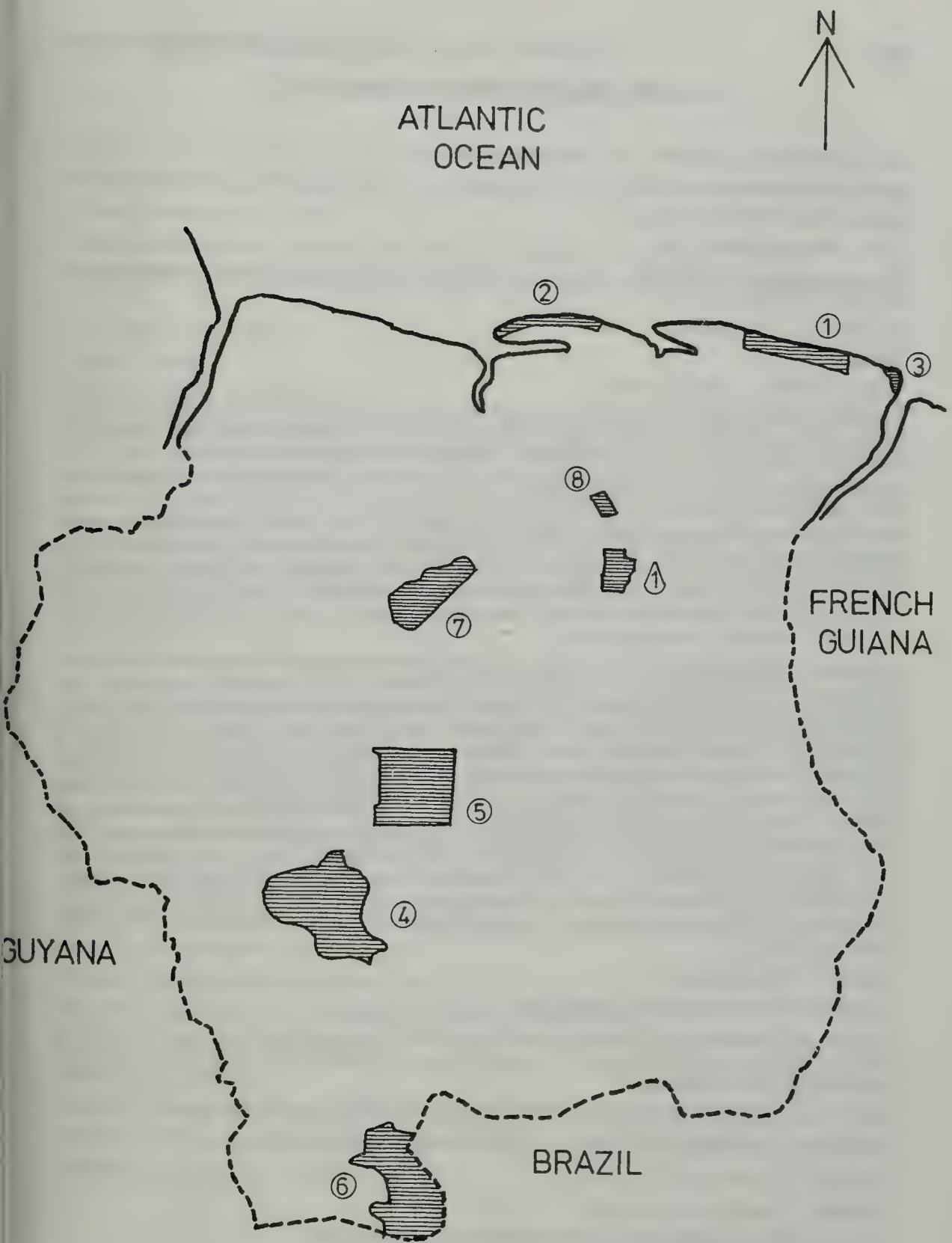
Mittermeier, R.A. (1977). Distribution, synecology and conservation of Suriname monkeys. PhD Thesis, Harvard University, USA.

Roosmalen, M.G.M. van (1980). Habitat preferences, Diet, Feeding Strategy and Social Organization of the black spider monkey *Ateles paniscus paniscus* (Linnaeus 1758) in Suriname. Rijksinstituut voor Natuurbeheer - Rapport 80/13 Leersum.

TOTAL AREA UNDER PROTECTION: 582,000 ha.

PROTECTED AREAS:

Nature Reserves	(hectares)
1 Wia-Wia	36,000
2 Coppename River Mouth	12,000
3 Galibi	4,000
4 Eilerts de Haan	220,000
5 Tafelberg	140,000
6 Sipaliwini	100,000
7 Voltzberg—Raleighvallen	56,000
8 Brinckheuvel	6,000
Nature Park	
1 Brownsberg	8,000



Key

- NATURAL RESERVES
- △ NATURE PARK

(1) Wia-Wia Nature Reserve

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1961.

GEOGRAPHICAL LOCATION: 25km west of Galibi, covering 53km of coast and extending 6.9km inland; 6°50'N, 54°30'W.

ALTITUDE: Near sea level.

AREA: 36,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: Tidal mud flats, shoals, sand and shell beaches, salt water and brackish ponds, and lakes. There are also about 14,000 ha of offshore sandbars and mudflats included within the reserve. Most of the beaches are in cyclical succession because of the alternating processes of abrasion and sedimentation, with most of the sediment originating in the Amazon. Several old sand/shell beaches have been left behind inland and are now forested.

VEGETATION: Herbaceous beach vegetation with *Hibiscus tiliaceus* and *Thespesia populnea*, mature mangrove forest with *Avicennia germinans* and *Laguncularia racemosa*, scattered mangroves in brackish to fresh water, grass swamps including various species of grass and sedge, and the fern *Acrostichum aureum*, and with coast mud-grass vegetation and mangrove on the mudflats. Mangrove vegetation can be found within the reserve in most of the stages of succession. The littoral ridge wood includes species such as *Crataeva tapia* and *Cereus hexagonus*.

NOTEWORTHY FAUNA: The reserve was declared to protect Bigisanti Beach, which is a nesting site for green turtle *Chelonia mydas* (E), leatherback turtle *Dermochelys coriacea* (E), and olive Ridley *Lepidochelys olivacea* (E). Hawksbill turtles *Eretmochelys imbricata* (E) are also found, but they are rare here as at Galibi, and only one loggerhead turtle *Caretta caretta* (V) has been recorded nesting (Schultz *et al*, 1977). Giant armadillo *Priodontes giganteus* (V) is present. It is also the feeding grounds for numerous indigenous and migrant waterbirds including herons and egrets (Ardeidae), storks (Ciconiidae), ducks (Anatidae), roseate spoonbills *Platalea ajaja*, and flamingoes *Phoenicopterus ruber*; with breeding colonies of herons, egrets, scarlet ibis *Eudocimus ruber*, and black-bellied tree ducks *Dendrocygna autumnalis* and large numbers of breeding Bahama (or whitecheeked) pintails *Anas bahamensis*. There are also numerous migrant waders (or shorebirds) including plovers (Charadriidae), turnstones *Arenaria*, yellowlegs and sandpipers *Tringa*, and willets *Catoptrophorus semipalmatus*. Gulls and terns (Laridae), and skimmers (Rynchopidae) are also present in large numbers. White-tailed deer *Odocoileus americana* and black spider monkey *Ateles paniscus* (V) are found within the reserve, and there is habitat for jaguar *Panthera onca* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Extensive research on turtle nesting and its periodicity, geomorphology (and in particular study of the coastal beach processes), estuarine ecosystems (flora, vegetation, hydrobiology) and ornithology.

SPECIAL SCIENTIFIC FACILITIES: Guesthouse for research workers at Matapica.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 2 game wardens and 5 labourers.

BUDGET: US\$ 20,000 per annum.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 9 March 1979.

(2) Coppename-Mouth Nature Reserve

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: Protected since 1953, but established as a reserve since 1966.

GEOGRAPHICAL LOCATION: At the mouth of the Coppename River, central coast; 5°50'N, 55°50'W.

ALTITUDE: Near sea level.

AREA: 10,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: Wide tidal mud flats, lagoons and brackish herbaceous swamps, in the estuary of the Coppename and Saramacca Rivers, and along the Atlantic coast. Sand beaches and ridges.

VEGETATION: Coastal mudgrass vegetation with *Spartina brasiliensis*, various types of young and old stages of mangrove forest with *Avicennia germinans* and *Laguncularia racemosa*, salt water ponds and shallow lagoons with *Sesuvium portulacastrum*, *Batis maritima*, and *Sporobolus virginicus*. Coastal beach vegetation with *Hibiscus tiliaceus*, *Thespesia populnea* and *A. germinans*, and littoral ridge wood with *Crataeva tapia* and *Cereus hexagonus*. In the estuary the species change because of the freshwater influence. The short grass and fern swamps include two species of sedge *Eleocharis mutata* and *Cyperus articulatus*, and in the estuarine mangroves the *Avicennia* and *Laguncularia* species are joined by *Rhizophora mangle*, and the palm *Euterpe oleracea*.

NOTEWORTHY FAUNA: The reserve was primarily established to protect nesting colonies and roosting sites of a number of herons, spoonbills and ibises: the Louisiana or tricoloured heron *Egretta tricolor*, the little blue heron *E. caerulea*, the yellow-crowned and black-crowned night herons *Nycticorax violaceus* and *N. nycticorax*, the great egret and snowy egret *E. alba* and *E. thula*, scarlet ibis *Eudocimus ruber* and roseate spoonbill *Platalea ajaja*. The boat-billed heron *Cochlearius cochlearius* has also been recorded here. A number of migrant birds such as the magnificent frigatebird *Fregata magnificans* and the black skimmer *Rhynchops nigra* visit the reserve, as well as a number of the species of shorebird recorded for the Wia Wia Nature Reserve. The black spider monkey *Ateles paniscus* (V) is also present and the Caribbean manatee *Trichechus manatus* (V) has been reported. Giant armadillo *Priodontes giganteus* (V) is also found.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: Poaching.

SCIENTIFIC RESEARCH: Ornithology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 1 game warden and 2 guards.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

(3) Galibi Nature Reserve

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1969.

GEOGRAPHICAL LOCATION: On the mouth of the Marowijne River, which forms the frontier with French Guiana in the northeast corner of the country; 5°45'N, 54°W.

ALTITUDE: Near sea level.

AREA: 4,000 ha.

LAND TENURE: All federally owned.

PHYSICAL FEATURES: Mud banks, sandy beaches and mangrove forests predominate in this low-lying coastal reserve.

VEGETATION: There are three main vegetation types, mature mangrove forest with *Avicennia germinans* and *Lagunaria racemosa*, mixed xerophytic coastal woodland (rich in cacti) and brackish short-grass swamp with *Cyperus articulatus* and *Eleocharis mutata* (and *Typha angustifolia*, *Phragmites australis* and *Leersia hexandra* further into the estuary). Freshwater also affects the mangrove associations, and *Rhizophora mangle* increases in numbers. There are also various types of beach vegetation with species such as *Ipomoea pes-caprae*, *Canavalia maritima*, *Hibiscus tiliaceus*, *Thespesia populnea*, and the mangrove *A. germinans*, and littoral ridge savanna/woodland with *Paspalum maritimum*, *Chrysobalanus icaco* and *Clusia panapanari* in the savanna areas, and *Crataeva tapia* and *Cereus hexagonus* in the wood.

NOTEWORTHY FAUNA: The reserve was established to protect the Eilanti Beach, one of the most important Atlantic nesting beaches for the Pacific Ridley or olive turtle *Lepidochelys olivacea* (E), and one on which mass nesting aggregations occur. Two other turtle nesting beaches, Galibi and Baboensanti are also protected. Green turtle *Chelonia mydas* (E) and leatherback turtle *Dermochelys coriacea* (E) also nest here (the latter particularly on Baboensanti Beach), and caymans *Caiman crocodilus crocodilus* (V) are found in the area. Black spider monkey *Ateles paniscus* (V) is also reported and giant armadillo *Priodontes giganteus* (V) is found.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported, but there is tourism, and fishing is practised by aborigines from the beach (OAS, 1979). Egg exploitation was severe in the past.

SCIENTIFIC RESEARCH: Extensive research has been carried out on turtle nesting and on geomorphology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A game warden and 6 labourers.

BUDGET: US\$ 20,000 per annum.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 9 March 1979.

(4) Eilerts de Haan Gebergte Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1966.

GEOGRAPHICAL LOCATION: Southwestern Suriname, 3°20'N, 56°30'W.

ALTITUDE: 100-1000m.

AREA: 220,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: Largest of Suriname's reserves, the major part of which is a granitic mountain ridge, characterised by steep hills and ridges. The whole ridge is an example of a rejuvenated erosional landscape, the rocks (which are of Precambrian age) having been uplifted again in recent geological time.

VEGETATION: The ridge is covered with primaeval evergreen seasonal rainforest, and lower montane rainforest.

NOTEWORTHY FAUNA: Black spider monkey *Ateles paniscus* (V) was reported here by Mittermeier (1977) and giant armadillo *Priodontes giganteus* (V) is present.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Only on the geology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

(5) Tafelberg Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1966.

GEOGRAPHICAL LOCATION: Central Suriname; 4°00'N, 56°10'W.

ALTITUDE: 500-1025m (above a plain at 300m).

AREA: 140,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: The Tafelberg is a flat topped 'Table Mountain', the only extensive remnant of the Proterozoic Roraima Formation in Suriname. The mountain is composed of sandstone with a cap of

conglomerate, and forms a high sandy mesa about 5,000 ha in extent which is delimited by steep scarp slopes on which there are a number of high waterfalls. The surrounding area consists of a forest-covered pediment, again sandstone, but with the underlying granitic basement rocks nearer to the surface.

VEGETATION: Soils are shallow and much of the reserve is covered by scrub savanna and dry evergreen forest/woodland. At higher elevations there is a semi-montane rainforest, while marsh forest is also found within the area wherever drainage is impeded. There are a number of endemic plant species known from the Tafelberg.

NOTEWORTHY FAUNA: Little known, though there have been studies carried out on birds and amphibians. Black spider monkey *Ateles paniscus* (V) is reported by Mittermeier (1977) and giant armadillo *Priodontes giganteus* (V) is present.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Studies have been made of the geology and flora, and there are collections of birds and amphibians.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

(6) Sipaliwini Savanna Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1971.

GEOGRAPHICAL LOCATION: On the border of Suriname and Brazil; 2°00'N, 56°00'W.

ALTITUDE: Somewhere between 200 and 500m.

AREA: 100,000 ha.

LAND TENURE: No information, but presumably government owned.

PHYSICAL FEATURES: Part of the extensive Paru savanna of Brazil, the undulating terrain of Sipaliwini includes large boulders, inselbergs and solitary hills. The underlying rocks include volcanites (dacites and rhyolites), granites, diorites and quartzdiorites, and the soils are shallow. The whole area is part of the Corantijn River basin, and is drained by the Sipaliwini River.

VEGETATION: Savanna and gallery forests, with isolated forest patches, and swampy areas where drainage is poor. Early studies of the area (Van Donselaar, 1965) suggested that the plant associations found here were unique for the Paru-Sipaliwini savannas, showing more affinities to the Rupununi-Rio Blanco savannas of Brazil and Guyana. In addition a relatively high proportion of the species (25%) are at their northern distribution in the Sipaliwini savanna. The area has never been pastured, but the savanna has undoubtedly been frequently burned in the past.

NOTEWORTHY FAUNA: Giant anteater *Myrmecophaga tridactyla* (V), giant armadillo *Priodontes giganteus* (V) and savanna fox *Dusicyon thous*, with tapir *Tapirus terrestris* in the moister areas. Black

spider monkey *Ateles paniscus* (V) is reported by Mittermeier (1977). The fish fauna has been reported to be rich, and there are numerous birds characteristic of the savanna, some of which are found nowhere else in the country (and some nowhere else north of the Amazon).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Studies have been conducted on geology, geomorphology, flora, part of the fauna and the archaeology of the area. There are also a number of maps available for the area showing geology (1:100,000), geomorphology (1:500,000) and topography (1:100,000).

SPECIAL SCIENTIFIC FACILITIES: Cheap accommodation for scientists.

PRINCIPAL REFERENCE MATERIAL: Donselaar, J. van. (1976). Rapport over een botanische orientatietocht naar de savanna in het gebied van de boven-Sipaliwini. Report to the Forest Service and to WOTRO. 18 + 16 pp (typescript).

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

(7) Voltzberg-Raleighvallen Nature Reserve

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1961.

GEOGRAPHICAL LOCATION: North central Suriname, 4°45'N, 56°10'W.

ALTITUDE: 50-360m.

AREA: 56,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: Gently undulating with granitic hills and inselbergs rising 100 to 250m above the surrounding forest. There are many waterfalls and rapids, and the reserve includes the spectacular Raleigh Falls, a braided system of boulder strewn rapids and falls in the Coppename River.

VEGETATION: Tropical lowland rainforest covers much of the land, with a characteristic xerophytic vegetation on the granite outcroppings which includes a number of endemic species. The rocks in the rivers are partially vegetated, and the species found there include several endemic members of the Podostemaceae, an unusual family of Angiosperms (resembling bryophytes or algae) which are only found growing on rocks in the rushing water of rivers and cataracts.

NOTEWORTHY FAUNA: The forest fauna includes parrots and macaws (Psittacidae), toucans (Ramphastidae), jacamars (Galbulidae), trogons (Trogonidae) and many other species of bird. There are also eight species of monkey (all the species recorded in Suriname), including black spider monkey *Ateles paniscus*(V). Jaguar *Panthera onca* (V), ocelot *Felis pardalis* (V) and other forest cats *Felis* spp., giant armadillo *Priodontes giganteus* (V), bush dog *Speothos venaticus* (V) and probably giant otter *Pteronura brasiliensis* (V) are all present. The reserve also contains prime nesting sites for a number of colony nesting birds associated with water, scarlet ibis *Eudocimus ruber*, roseate spoonbill *Platalea ajaja*, and magnificent frigatebird *Fregata magnificens* (OAS, 1979).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Studies of the succession and phytosociology of the xerophytic vegetation of the granitic outcroppings. Geological inventory, and studies of the weathering processes of exposed granite.

SPECIAL SCIENTIFIC FACILITIES: A major research centre is planned for the Raleighvallen area.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A park manager and an assistant manager, 2 guards and 10 labourers.

BUDGET: US\$ 50,000 per annum.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

(8) Brinckheuvel (Saban-Pasi) Nature Reserve

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1961.

GEOGRAPHICAL LOCATION: 100km south of Paramaribo; 5°15'N, 55°20'W.

ALTITUDE: 70m.

AREA: 6,000 ha.

LAND TENURE: Federally owned.

PHYSICAL FEATURES: Low, pebble-covered, residual subgreywacke and conglomerate ridges and hills of Precambrian age belonging to the Guyanan shield. The ridges are separated by flat alluvial areas, and the whole area lies between the Saramaca and Suriname Rivers. The three hills of the reserve are covered by a bleached sand, the remains of the highest terrace of the White-Sand series. The reserve was established to protect an area which is of particular geological and pedological interest.

VEGETATION: Most of the area is covered by one-layered sedge grass, orchard savanna and savanna bush communities of the Saban-Pasi type, while on the bleached sand is found savanna vegetation of the Cassipora type. The savanna is understood to be of pyrogenic origin.

NOTEWORTHY FAUNA: Tapir *Tapirus terrestris*. black spider monkey *Ateles paniscus* (V) and giant armadillo *Priodontes giganteus* (V).

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported, but if secondary succession is being controlled there are likely to be some problems encountered in trying to maintain a savanna type vegetation by fire.

SCIENTIFIC RESEARCH: Geology, geomorphology and vegetation studies.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: Forest Service.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 9 March 1979.

(1) Brownsberg Nature Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1969.

GEOGRAPHICAL LOCATION: Situated at edge of Brockopondo Reservoir, 130km south of Paramaribo; 4°50'N, 55°20'W.

ALTITUDE: 500m.

AREA: 8,400 ha.

LAND TENURE: Held by STINASU on long-term lease from the government.

PHYSICAL FEATURES: Steep forest-clad slopes with creeks and waterfalls. The park includes part of the Brownsberg plateau lying at about 500m, which is covered by a bauxite carapace.

VEGETATION: Tropical rainforest and woodland/mesa on the bauxite of the plateau, and to the northwest of Lake Brockopondo.

NOTEWORTHY FAUNA: There is a great variety of birds and seven species of monkeys are known from the park. Agoutis (Dasyproctidae) and brocket deer (*Mazama*) are common, and jaguar *Panthera onca* (V), ocelot *Felis pardalis* (V) and other cats (*Felis* sp.) are found. Black spider monkey *Ateles paniscus* (V) is reported by Mittermeier (1977). The area is also of interest for studying insects and amphibians. For these reasons the Nature Park was initially considered as an 'educational reserve'.

ZONING: No information.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Continuing research programme underway.

SPECIAL SCIENTIFIC FACILITIES: Study camps for environmental education and cheap group accommodation for scientists.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: A park manager, 4 assistant managers and 12 labourers.

BUDGET: US\$ 65,000.

LOCAL PARK OR RESERVE ADMINISTRATION: STINASU (though ultimate responsibility presumably remains with the Forest Service).

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 10 March 1979.

TRINIDAD AND TOBAGO

AREA: 5,128 sq km.

POPULATION: 1,133,000 (1978).

PARKS AND RESERVES LEGISLATION: Under the Conservation of Wildlife Ordinance no. 16 of 1958, 13 Game Sanctuaries have been established. The Chief Game Warden, with the approval of the Minister, may add to, delete, or change the boundaries of these Game Sanctuaries. Hunting is prohibited in Game Sanctuaries but other activities such as timber exploitation may take place. Areas which are part of a Forest Reserve or Crown Land may be declared by the President to be 'prohibited areas' under the Forest Ordinance of 1950 which prohibits any unauthorized entry. In addition, the Marine Areas (preservation and enhancement) Act, 1970, allows marine areas to be protected 'restricted areas'. No legislation provides the necessary authority to establish and manage national parks. Also relevant is the Town and Country Planning Ordinance of 1960, the Land Acquisition Ordinance of 1947 and the State Land Ordinance of 1950.

PARKS AND RESERVES ADMINISTRATION: The responsibility for the management of Wildlife Sanctuaries lies with the Forestry Division of the Ministry of Agriculture, Lands and Fisheries. Legislation which provides for the establishment of reserves and other protected areas does not specify that management be such as to restrict use to ensure adequate protection of the resources. This has led to destruction of natural habitat and recreation potential in many reserves and sanctuaries. Forest reserves are geared towards production of forest products. The marine areas act, while providing for protection and use of sites, cannot be used to create parks, and does not provide any management infrastructure.

ADDRESS: Forestry Division, Long Circular Road, Port of Spain, Trinidad.

REFERENCES: Thelen, K.D. and S. Faizool (1980). Policy for the Establishment and Management of a National Park System in Trinidad and Tobago. Forestry Division, Ministry of Agriculture, Lands and Fisheries, Port of Spain, Trinidad.

Wildlife Conservation Committee (1972). The Wildlife Sanctuaries of Trinidad and Tobago. Ministry of Agriculture, Lands and Fisheries, Trinidad and Tobago.

TOTAL AREA UNDER PROTECTION: 16,805 ha.

PROTECTED AREAS:

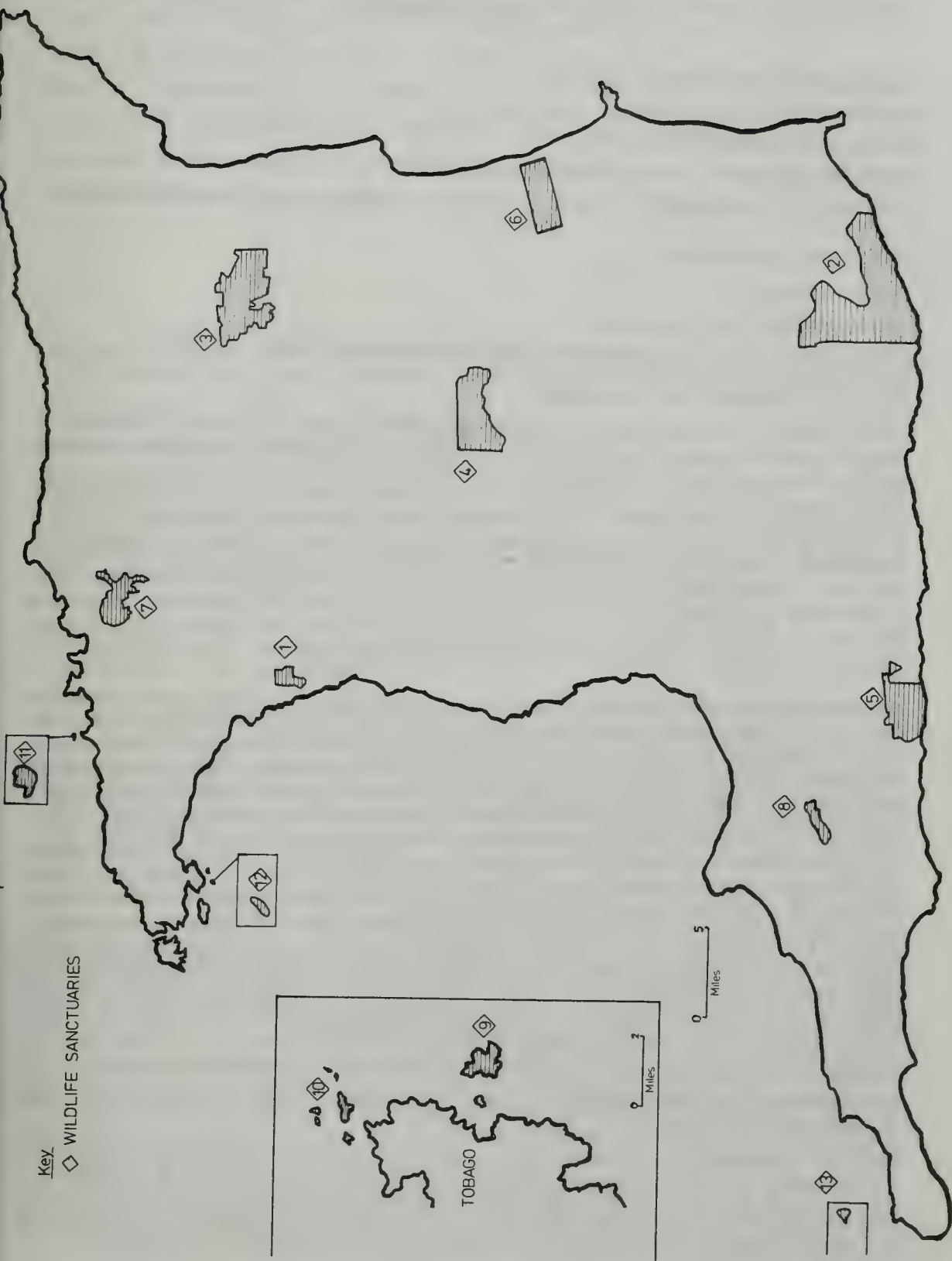
Wildlife Sanctuaries	(hectares)
1 Caroni*	7,900
2 Trinity Hill	6,486
3 Valencia	2,736
4 Central Range	2,128
5 Southern Watershed	1,852
6 Bush Bush	1,536
7 Northern Range	937
8 Morne L'Enfer	334
9 Little Tobago	101
10 St Giles Islands	29
11 Saut D'Eau*	10
12 Kronstadt Island	5
13 Soldado Rock	1
Forest Reserve	
1 Los Santos*	62,000

* There is also the Buccoo Reef/Bon Accord Lagoon Restricted Area of 650 ha.

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.

Key

◇ WILDLIFE SANCTUARIES



(1) Caroni Swamp

MANAGEMENT CATEGORY: Unknown.

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Partial (5%).

DATE ESTABLISHED: 1936, and decommissioned in 1982.

GEOGRAPHICAL LOCATION: West coast of Trinidad, southeast of Port of Spain; 10°31'-10°37'N, 61°25'-61°30'W.

ALTITUDE: Near sea level.

AREA: 7,900 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The Sanctuary is all low-lying swampy soil which is flooded by the high spring tides. This land, on which stands the mangrove forest, is interrupted by lagoons and numerous channels which drain westwards to the Gulf of Paria.

VEGETATION: The vegetation in the Sanctuary area consists entirely of mangroves which produce trees up to 24m high in places. Four species of mangroves occur; the red mangrove *Rhizophora mangle* is the most abundant, occupying the edges of the water channels and covering the small islands in the lagoon. This species grows on the muds and produces a dense mass of supporting roots, some of which extend into the channels and provide settlement area for a prolific epifauna. Within the mangrove forest, away from the channels where the muds are more consolidated, the black mangrove *Avicennia germinans* forms dense stands of low trees carpeted below by the aerial roots or pneumatophores. The black mangrove gives way to regions where the soil is very compact and water movements are minimal. Under these conditions the mangroves die, leaving barren expanses. The white mangrove *Laguncularia racemosa* is fairly common also but normally grows in association with either of the other species, and rarely forms pure stands. There is an absence of ground vegetation, although some ferns appear where there are artificial embankments.

NOTEWORTHY FAUNA: The fauna of the mangrove forest is rich and varied. 138 species of birds have been recorded in the Caroni Swamp; the majority of these can be seen in the Sanctuary throughout the year. 54 of these birds are known to nest here, including the scarlet ibis *Eudocimus ruber*. About 220,000 ibis occur in the swamp at the present time and can be seen feeding on the mud flats or roosting in the mangrove trees during most of the year. Many of the other species are water birds like herons, ducks, egrets and ospreys, although doves, orioles and flycatchers are also common. A few mammals are found in the Sanctuary, although they are nowhere common. These include the mangrove dog or crab-eating racoon *Procyon cancrivorus*, the silky anteater or 'Poor Me One' *Cyclopes didactylus* and various tree rats. The alligator *Caiman sclerops*, once common in the swamp, is now an occasional visitor to the Sanctuary. The submerged prop roots of the red mangrove support dense growths of the edible mangrove oyster *Crassostrea rhizophorea*, together with mussels, barnacles, hydroids, sponges, tunicates, tube worms and other sedentary marine or estuarine species. Crabs abound on the mud flats and on the muddy mangrove forest floor. Especially abundant are the fiddler crabs *Uca* sp., the mangrove tree crab *Aratus pisonii* and two species which are used for food, the hairy crab *Ucides cordatus* and the blue crab. The river's lagoons and water channels are rich in edible fish including grouper *Mycteroperca* sp., tarpon *Tarpon atlanticus*, mullet *Mugil* sp., snapper *Lutjanus* sp. and catfish.

ZONING: About 202 ha of the Reserve is zoned as 'prohibited area', which restricts entry.

DISTURBANCES OR DEFICIENCIES: Danger of pollution from external sources, hunting and poaching, land development.

SCIENTIFIC RESEARCH: A number of research projects concerning the flora and fauna of the swamp are at present in progress, some in conjunction with the University of the West Indies. French (1966) has reported on the use of mangroves by birds in Trinidad. The natural history of the scarlet ibis has been extensively studied in the swamp by French (French and Haverschmidt, 1970) and a report on the general ecology of the area has been prepared by Bacon (1970) who also described the edible shellfish.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Bacon, P.R. (1970). Ecology of the Caroni Swamp. Trinidad Government Printing Office.

1979. Proposed Management and Development Plan for the Caroni Swamp National Park, Division of Forestry, Ministry of Agriculture, Lands and Fisheries, Trinidad and Tobago.

STAFF: A manager and 4 game wardens are assigned to the area.

BUDGET: \$250,000 per year (US\$ 100,000).

LOCAL PARK OR RESERVE ADMINISTRATION: Division of Forestry Ministry.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(2) Trinity Hill Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 June 1934.

GEOGRAPHICAL LOCATION: Southeastern portion of the country, Trinity Ward in the county of Mayaro; 10°04'-10°12'N, 61°04'-61°11'W.

ALTITUDE: 15-300m.

AREA: 6,486 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The Trinity Hills, which form part of the Southern Range of hills, run across the south of the sanctuary, parallel to the sea coast. The highest point of the Southern Range, Mount Derrick, is found here, with an elevation of 304m. The Kapur Ridge runs north from the Trinity Hills on the eastern border of the sanctuary, and its does not rise above 95m. Elsewhere in the sanctuary the country is undulating land between 15 and 60m high. Due to its topography, the area is well drained. The Kapur ridge forms a watershed between the Pilote River and its tributaries flowing eastwards, and the Blackwater, Lucy, Stone, Petite and Grande Rivers and their tributaries which flow westwards into the Moruga River. The Hilarie and La Table Rivers, as well as a number of minor streams, rise on the southern slope of the Trinity Hills and flow southwards. The soils are mainly sands, loams and clays derived from the erosion of tertiary sediments. The fertility and drainage of the soils are moderate although some areas experience desiccation and occasional rocks appear at the surface or in the profile.

VEGETATION: The sanctuary is covered by tropical forest of the crappo-guatemare association. It shows two distinct facies, however, which occur in different locations; one is characterized by bois mulatre *Pentaclethra macroloba* and carat *Sabal glaucescens* and the other is mora *Mora excelsa* forest. The commonest large trees in the Bois Mulatre-Carat forest areas are crappo *Carapa guianensis* and wild chataigne *Pachira insignis*, with guatemare *Eschweilera subglandulosa* in third place among acurel *Trichilia oblanceolata*, rosemacho *Crudia glaberrima* and redwood *Gaurea guara*. Bois mulatre *Pentaclethra macroloba* is the chief tree of the canopy layer over large areas and throughout this forest type the characteristic palm, and most abundant lower storey plant, is carat *Sabal glaucescens*. It appears that the mora *Mora excelsa* has invaded this area in relatively recent times and has not yet reached the limits of its distribution in the southern range hills.

NOTEWORTHY FAUNA: 16 mammals, other than rats and mice, have been recorded, including all the game mammals such as lappe *Agouti paca*, agouti *Dasyprocta aguti*, collared peccary *Tayassu tajacu*, nine-banded armadillo *Dasyus novemcinctus* and red brocket deer *Mazama americanus* together with anteaters, porcupines *Coendu prehensilis*, manicous, tayras *Eira barbara* and squirrels. The ocelot *Felis pardalis* (V) is now rare if not completely absent, but troops of both the capuchin *Cebus albifrons* and howler monkeys *Alouatta seniculus* still survive. The reptiles include morocoys *Geochelone denticulata*, galaps *Geomyda punctularia*, alligators *Caiman sclerops*, iguana *Iguana iguana*, matte *Tupinambis*

negropunctatus, zandolie *Ameiva ameiva* and twenty-four-hours lizards *Polyorour marmorata*; snakes include the bushmaster *Lachesis muta*, fer-de-lance *Bothrops atrox*, macajeu *Constrictor constrictor*, black cribo *Clelia clelia*, green horsewhip *Leptophis ahaetulla* and machete *Drymobius boddaerti*. 31 birds have been recorded in the sanctuary to date, but the number of species living there is probably much higher. Most of them are common forest birds, but two species are of special interest. These are the rare mountain quail-dove *Geotrygon linearis* and the paui *Pipile pipile* (E), which was thought to be extinct in Trinidad. The only reliable record in recent years of the paui, which is endemic to the country, is from the Trinity Hill areas.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Exploration for oil, involving cutting and clearing; poaching.

SCIENTIFIC RESEARCH: None known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation is made to the sanctuary.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(3) Valencia Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: June 1934.

GEOGRAPHICAL LOCATION: Northeast of Trinidad in the county of St Andrews; 10°36'-10°39'N, 61°06'-61°11'W.

ALTITUDE: 7.5-15m.

AREA: 2,736 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The topography is flat with undulations ranging from 7.5 to 15m above sea level. Terrace deposits of fine sands cover most of the area and consist of between 1-3m of loose and overlaying cemented gravel, which forms an indurated pan. Drainage is imperfect with the land surface characterized by a hogwalled micro-relief. The soils of the river flats are of a silty clay. The area is well served by the Barro, Turure and La Seiva rivers which flow in a southerly direction through the sanctuary.

VEGETATION: The natural forest, according to Beard (1946) was partly a Crappo-Guatemare association, in which mora *Mora excelsa*, olivier *Terminalia amazonia*, crappo *Carapa guianensis* and mahoe *Sterculia caribaea* made up the dominants, and partly a galba-palm swamp forest. In the latter areas galba *Calophyllum lucidum*, timite *Manicaria saccifera*, palma-real *Jessenia oligocarpa* and manac *Euterpe* sp. were the common trees. Now the whole area can be divided into mora forests, mixed forests, and scrub forests. The scrub and burnt areas are now being converted to pine forests.

NOTEWORTHY FAUNA: The Trinidad Regional Virus Laboratory has recorded 50 species of birds in this area. All are birds typical of lowland forest, such as doves, antbirds, manakins, flycatchers and tanagers, but they are not peculiar to this area. Other animals which have been recorded in this sanctuary

include deer *Mazama americana*, quenk *Tayassu tajacu*, agouti *Dasyprocta agouti*, tatoo *Dasypus novemcinctus*, matte *Tupinambis negropunctatus*, iguana *Iguana iguana*, morocoys *Geochelone denticulata* and several species of snakes.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The area is significantly disturbed by timber harvesting, the establishment of pine plantations, quarrying and poaching.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No specific budget for wildlife protection in the area.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(4) Central Range Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1934.

GEOGRAPHICAL LOCATION: Northwest portion of the Central Range in counties Caroni, St Andrew and Nariva; 10°24'-10°27'N, 61°12'-61°16'W.

ALTITUDE: 180m.

AREA: 2,128 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: Typically rolling hill country reaching to just over 200m in places. It is well watered and well drained as the Talparo and Tumpuna Rivers and most of their tributaries have their sources in the Sanctuary. These rivers flow north westwards to join the Caroni River. The forest soil is a shallow, sticky, yellow clay directly overlying bedrock which frequently outcrops through it. There is no humus horizon, although a thin layer of leaf litter lies on the surface year round. The rock outcrops are of marly limestone which is strongly calcitised. Drainage is very rapid because of the steepness of the slopes and the permeability of the rock.

VEGETATION: The vegetation of the region is basically rainforest in which crappo, guatecare and carat are prominent, but the low rainfall and the excessive drainage on the limestone hillsides combine to produce a somewhat xerophytic association. In this association acurel, moussara and foguier are the dominant trees although cedar *Cedrela mexicana*, poui *Tabebuia* sp., mahoe *Sterculia caribaea*, balata *Mimusops balata* and silk cotton *Ceiba pentandra* occur at intervals. This produces an open forest type with the canopy at 6-12m, with occasional emergent trees of 30m or more. Lianes are well developed, but epiphytes only weakly so, and palms are frequent. There is a shrub layer with *Apehlandra* but little ground vegetation. Forest clearings are taken over by balisier *Heliconia* sp. and aroids like *Xanthosoma jacquinii*.

NOTEWORTHY FAUNA: Many of the common forest mammals are found in the Central Range Sanctuary. These include game mammals such as deer *Mazama americana*, armadillo *Dasypus novemcinctus*, agouti *Dasyprocta agouti*, lappe *Agouti paca* and quenk *Tayassu tajacu* and, although no

census has been taken there, these are thought to be relatively abundant. Troops of both the red howler *Alouatta seniculus* and Trinidad capuchin monkey *Cebus albifrons* are seen there regularly. The bird life of the Sanctuary has not been documented but is typical of the Central Range, that is, containing a high variety of species without the higher montane birds found in the Northern Range. Manakins, flycatchers and antbirds are common, along with trogons *Trogon strigilatus*, woodpeckers and toucans *Ramphastos vitellinus*. The pawi *Pipile pipile* (E) has also been reported here.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Exploitation of native forestry, introduction of teak plantation, and poaching.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation to the management of the sanctuary.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial.

INFORMATION DATED: March 1979.

(5) Southern Watershed Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1934.

GEOGRAPHICAL LOCATION: Southwestern portion of the country in the county of St Patrick; 10°03' to 10°06'N, 61°27'-61°31'W.

ALTITUDE: 0-138m.

AREA: 1,852 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The hills of the Southern Range, with gentle slopes to the north and south, run along the centre of the sanctuary. Altitudes vary from sea level along the Columbus Channel to 138m at Devil's Knoll, Morne Diablo Trigonometric Station No. 131. Most of the area lies between 15m and 45m high. The sanctuary is covered by a patch mixture of seven different types of clay soils. These have slow to moderate drainage and are susceptible to landslides and erosion of denuded soil.

VEGETATION: The Southern Watershed Sanctuary has a semi-deciduous tropical forest of the acurel-mousara association in which the carat palm is also abundant. The dominant trees are acurel *Trichilia oblanceolata*, mousara *Brosimum alicastrum* and cedar *Cedrela mexicana*, among which a number of other valuable timber trees are found. These include fustic *Chlorophora tinctoria*, species of the Lauraceae, acoma *Sideroxylon quadrilobum*, black fiddlewood *Vitex divaricata*, cypre *Cordia alliodora* and black poui *Tabebuia rufescens*. Others found occasionally are the white fiddlewood *Vitex capitata*, saltfishwood *Machaerium robinifolium*, naked indian *Bursera simaruba* and hog plum *Spondias monbin*, and among the smaller trees of the lower canopy, white grape *Coccoloba venosa*, obi *Trichilia trinitensis*, wild guavas (Myrtaceae), wild orange *Swartzia simplex* and carat *Sabal glaucescens*. One noticeable feature of this forest is the extraordinary variation in dominant tree type from point to point. This is probably due to past human interference. The ground vegetation layer is virtually absent in wide

areas and the soil bare. The thick carpet of dead leaves produced each year is rapidly decomposed, leaving little visible humus.

NOTEWORTHY FAUNA: Mammals are fairly common in the sanctuary; in addition to the smaller agouti *Dasyprocta agouti*, maniocou, squirrels and rats, these include the deer *Mazama americana*, tatoo *Dasytus novemcinctus*, matapel *Tamandua longicaudata* and tiger cat *Felis pardalis*(V). Lizards and snakes are abundant and the alligator and freshwater turtles, the morocoy *Geochelone denticulata* and galap *Geomyda punctularia*, are fairly common in the streams. Among the more conspicuous lizards are the Iguana and the Matte and the snakes recorded include the macajeul *Constrictor constrictor*, green horsewhip *Leptophis ahaetulla* and machete *Drymobius boddaerti* and the poisonous bushmaster *Lachesis muta* and fer-de-lance *Bothrops atrox*. Toucans, Amazon parrots and parakeets are included among the varied bird fauna of the Southern Watershed Sanctuary. Some of the more interesting birds to be seen are the blue-headed parrot, the cravat *Tanagra trinitatis* and the black and white woodpecker *Phloeocaster melanoleucus*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Introduction of teak plantations, poaching and squatting have caused disturbances in portions of the sanctuary.

SCIENTIFIC RESEARCH: None known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No specific budget allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(6) Bush Bush Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1968.

GEOGRAPHICAL LOCATION: Nariva Swamp in east central Trinidad; 10°23'-10°24'N, 61°06'-61°01'W.

ALTITUDE: 0-3m.

AREA: 1536 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The Sanctuary includes not only low-lying swampy areas but also firm ground, known as Bush Bush and Bois Neuf islands, with true hardwood forests. The swamp receives its waters from the Navet, Bois Neuf and Guatacara rivers, which drain the eastern slopes of the Central Range. In the rainy season there is a considerable amount of water in the swamp, which makes Bush Bush inaccessible except by boat through a narrow canal. At the height of the rainy season the island is only 3m above the surrounding swamp. The water level drops considerably in the dry season and there have been a few dry seasons when it was possible to reach the island by foot with relative ease. The soil is sandy and as such is well drained. Rainfall averages about 250 cm annually.

VEGETATION: Bush Bush island is a true hardwood forest and resembles Beard's description of an 'Evergreen seasonal forest: Crappo Guatacare type'. The main canopy is at about 21-24m, with a few emergents reaching to 30 m. There is a secondary canopy of 12-15m, consisting of timite palms, while the forest floor is made up of timite and seedling trees. Some of the hardwoods were cut prior to 1960 and occasional fires have occurred from time to time in the northern part of the island, but the forest has not changed appreciably. Towards the eastern boundary of the island, and in the swamp proper, are magnificent stands of swamp bloodwoods and moriche palms, while the open swamp consists of a dense matting of grass.

NOTEWORTHY FAUNA: Considering the size of the area, an extremely rich and varied fauna is to be found. Both species of monkey which are known to exist in Trinidad - the red howler *Alouatta seniculus* and the weeping capuchin *Cebus albifrons* - are present in this sanctuary. 57 other species of mammals (including 32 species of bats) have been collected, seen or deduced to be present by staff members of TRVL. Among these are three species of opossums, the three-toed anteater and two-toed anteater *Cyclopes didactylus*, and 13 species of rodents, which include the agouti *Dasyprocta agouti*, lappe Agouti *paca* and the tree porcupine. Some 34 families, representing 171 species, of birds have been recorded in the area. Dominant species include the manakins, tanagers, antbirds, woodcreepers and the very vociferous parrots. Among the reptiles, the zandolie *Ameiva ameiva* and matte *Tupinambis negropunctatus* are the most common. However, caymans *Caiman sclerops*, commonly referred to as 'alligators', are by no means rare. Although 11 species of snakes have been seen or collected, including the anaconda *punctatus murinus*, only one is poisonous, the fer-de-lance or mapepire balsain *Bothrops atrox*. The fish fauna has not been adequately studied, but the cascadura *Hoplosternum littorale* is common. Amongst the invertebrates, only the blood-sucking species of insects and arachnids have been studied. Of these, the mosquitoes predominate with about 92 species being recorded.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Poaching of wildlife by hunters.

SCIENTIFIC RESEARCH: In 1959, staff members of the Trinidad Regional Virus Laboratory (TRVL) made exploratory trips into Bush Bush forest with a view to setting up a field station to study the endemic cycle of yellow fever virus. The small size of Bush Bush island with its relatively undisturbed habitats, lends itself readily to such a study. Staff members of TRVL worked in the area almost exclusively for nearly a decade, but scientists from other organizations, notably the New York Zoological Society, also worked in the area on short-term projects.

SPECIAL SCIENTIFIC FACILITIES: No information.

PRINCIPAL REFERENCE MATERIAL: Downs, W., Aitken, T.H.H., Worth, G.B., Spence, C.B. and Jonkers, A.H. (1968). Arbovirus studies in Bush Bush Forest, Trinidad, WI. 1959 - December 1964. Description of the study area. American Journal of Tropical Medicine and Hygiene 17: 224-236.

STAFF: Periodic patrols by game wardens.

BUDGET: No special allocations.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(7) Northern Range Wildlife Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1935.

GEOGRAPHICAL LOCATION: An area located in the westerly portion of the range of mountains extending east to west along the northern coast; 11°87'N, 61°25'W.

ALTITUDE: 304-935m.

AREA: 937 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The Northern Range Sanctuary, popularly known as the El Tucuche Reserve, is in the county of St George, bounded at the northern end of the Maracas Valley, north of St Joseph. The bulk of the reserve includes the summit of El Tucuche, Trinidad's second highest mountain, and adjacent Naranjo, but it also extends to the western side of Piedra Blanca at the head of the Caura Valley and along a narrower spur which extends downwards on the northern face of the same peak in the general direction of Las Cuevas Bay. The entire area is characterised by steep slopes and free drainage. Some of the northern slopes, particularly around the El Tucuche ridge and Naranjo, are precipitous and the entire area, with the exception of the actual summit of El Tucuche, is covered by vegetation. The climate of the reserve is mild by Trinidad standards. Rainfall is high, however, ranging up to approximately 350cm per year. There are no large rivers in the sanctuary, but there are numerous gullies and waterfalls which run seasonally. The soils of the sanctuary are comparatively thin layers of loam lying over schists. In some places there are massive outcrops of schist and on the southwestern slopes may be found deposits of magnetite ore.

VEGETATION: The two types of natural vegetation found are lower montane rainforest and montane rainforest. The former accounts for the greater part of the natural vegetation of the El Tucuche Reserve. Approximately 40 species of trees have been identified. Three of these are dominant - boisgris *Licania ternatensis*, mahoe *Sterculia caribaea* and serrette *Brysonima spicata*. Epiphytes are fairly common but are largely confined to the canopy, and palms are present but not common. Ferns are particularly abundant on the floor of the forest and there are a few epiphytic forms. Tree ferns are common in this area. Montane rainforest (cloud forest or elfin woodland) is essentially very similar in composition to the lower montane rain forest, except that the trees are very much smaller and the species number is much lower. In the montane rainforest of the El Tucuche Sanctuary, which is confined to a comparatively small patch on the lee side of the peak extending southward into the Maracas Valley, the trees are rarely higher than 15m. Ferns, mosses, orchids and aroids are all abundant and frequently festoon the vegetation at all levels. In contrast to the lower montane rainforest the species number does not exceed 15 and the dominant forms are bois bande *Roupala montana* and mountain guatecare *Eschweilera trinitensis*. Some of the more interesting plants include the giant bromeliad *Glomeropitchirnia erectiflora*, which may be found on the ground and epiphytically, *Epidendrum nocturnum* - an orchid which grows in profusion on trees along the switchbacks, and the giant *Utricularia*, which may be found among the *Selaginella* growing on the banks of the trail at the summit.

NOTEWORTHY FAUNA: At El Tucuche, while deer and monkeys have disappeared from sectors of the sanctuary and while lappe *Agouti paca* and agouti *Dasyprocta agouti* are becoming scarce, tatoo *Dasyus novemcinctus* are still relatively abundant. On the summit of El Tucuche the golden tree frog *Amphodus auratus* can be found. This frog is apparently confined to the summit, living in the bromeliads which occur there, and is found nowhere else in the world. Also on the Tucuche trail can be found, or rather heard, the giant earthworm *Megascolex* sp., which may measure up to 35cm in length. Interesting birds are the band-tailed pigeon *Columba fasciata*, the orange-billed nightingale-thrush *Catharus aurantiirostris* and the blue-capped tanager *Thraupis cyanocephala*, which are all distinctly local, occurring in the sanctuary only above 820m.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Fires and poaching occur in the Sanctuary.

SCIENTIFIC RESEARCH: No significant studies known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(8) Morne l'Enfer

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1958.

GEOGRAPHICAL LOCATION: Situated in the southwest corner of Trinidad in the county of St Patrick; 10°08'-10'N, 61°33'-37'W.

ALTITUDE: To 90m.

AREA: 334 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The topography throughout the area is gently undulating with hills nowhere exceeding 90m in elevation. The soils, which are of sedimentary origin, are made up of sands and silts with intercalations of clay and contain abundant lignites. The sands are usually well bedded and varve-like in appearance. A noticeable feature, however, is the frequent occurrence of black patches of discoloured soil which seem to indicate either oil residues or seepage.

VEGETATION: The forests here have been heavily exploited and/or destroyed in the past. The present vegetation comprises principally secondary forest growth of the following species: jereton *Didymopanax morototoni*, laurier (Lauraceae), mahoe *Sterculia caribbaea*, crappo *Carape guianensis*, bloodwood *Pterocarpus* sp., pois doux, l'épinet *Fagara* sp., silk cotton *Ceiba pentandra*, bois dorme *Guazuma ulmifolia* and immortelle. Except for the last four mentioned, the majority of the other trees do not exceed 12" in diameter. On the periphery of these small acreages of forests created by the numerous roads, the following species predominate: bois flot *Ochroma pyramdale*, keskadee *Vismia* sp., cocorite *Maximiliana elegans*, roseau *Bactris major*, balisier *Heliconia* sp., cashibou *Calathea* sp., bamboos and mangoes. The many trees present must be the result of seed dispersal by man during the early days of oil exploration in the area.

NOTEWORTHY FAUNA: The breaking up of the area into small parcels has adversely affected the game animals inhabiting the sanctuary. Nevertheless, there are still some tatoo, quenk, agouti, porcupine and maniocou left in the region. The sanctuary abounds with bird life which includes doves, parrots, parakeets, humming-birds, woodpeckers, tanagers, toucans *Ramphastos vitellinus* and yellowtails *Psarocolius decumanus*. In fact, the continuous chirpings, whistlings, bird calls and bird movements are pleasant and soothing in this environment which is studded with storage tanks, pipe lines, oil wells and black stagnant pools of oil residues.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The area has been leased to oil companies with surface rights, oil exploration is intensive and there are more than 225 wells within the sanctuary.

SCIENTIFIC RESEARCH: None known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrolling.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(9) Little Tobago

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1928.

GEOGRAPHICAL LOCATION: 1 mile off the northeast coast of Tobago near Speyside; 11°17'-11°18'N, 60°29'-60°31'W.

ALTITUDE: 137m.

AREA: 101 ha.

LAND TENURE: 100% state ownership on condition it be maintained as a sanctuary for the bird of paradise.

PHYSICAL FEATURES: The island is vaguely star-shaped, about 101 ha in extent, and is extremely hilly with steep sea-cliffs in many places, though the highest point is below 137m. Geologically it is from the Cretaceous period, with a shallow soil covering. Though there are no permanent ponds, a small spring flows throughout the year. The rainfall is less than 250cm per annum, and the prevailing winds across the sea have a considerably drying effect upon the vegetation.

VEGETATION: The island is mostly covered with deciduous seasonal forest, with trees averaging 12m in height. Most common are the fan-palm *Coccothrinax* sp. and the naked indian tree *Bursera simaruba*, while on the ground the aroid *Anthurium* is abundant. In addition, many introduced trees are common, including the papaya *Carica papaya*, banana and other fruit trees. On the cliff sides particularly much cactus is in evidence, along with the shrubby plants such as *Plumbago* and the strangler fig *Clusia* sp. At one time the Sea Island cotton *Gossypium* sp. was cultivated on the island and a few scattered plants remain.

NOTEWORTHY FAUNA: After a period when Sea Island cotton was grown, the island came into the hands of Sir William Ingram. Being concerned for the survival of birds of paradise, which were then being decimated in the East Indies by the plume trade, Sir William imported from the Aru Islands, off New Guinea, 48 individuals of the greater bird of paradise *Paradisaea apoda*, which were liberated on Little Tobago in 1909. In 1928, Sir William Ingram's heirs presented the island to the Government of Trinidad and Tobago, on condition that the island be kept as a sanctuary for the birds of paradise. Much controversy has raged over the fate of the birds of paradise. A study and investigation (1967) by J.J. Dinsmore, concluded that it is by no means certain that even half of the original stock of 48 birds survived liberation, though three more individuals were added by 1912. Certainly some birds bred, for individuals in immature plumage have been seen over the years, though no certain nest of the species has ever been found. Estimates now are that seven birds survive. Apart from the greater bird of paradise and the wild fowl *Gallus gallus*, 58 species of other birds have been recorded on Little Tobago, 33 of them breeding. Of particular interest are the seabirds, represented by sizeable colonies of Audubon's shearwater *Puffinus ijerminieri*, red-billed tropic-birds *Phaethon aethereus*, brown boobies *Sula leucogaster*, laughing gulls *Larus atricilla* and sooty, noddy and bridled terns *Sterna fuscata*, *Anous stolidus* and *S. anaethetus*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Some poaching occurs within the Sanctuary.

SCIENTIFIC RESEARCH: Studies have been carried out regarding the bird of paradise.

SPECIAL SCIENTIFIC FACILITIES: Housing accommodation for scientists is available on the island.

PRINCIPAL REFERENCE MATERIAL: Dinsmore, J.J. (1967). The Ecology and Behaviour of the

Greater Bird of Paradise on Little Tobago Island. Zoology Department, University of Wisconsin, Unpublished thesis.

Gilliard, G.T. (1958). Feathered Lancers of Little Tobago. National Geographic Magazine 1142: 428-440.

STAFF: 1 game warden.

BUDGET: No special management appropriation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(10) St Giles Islands

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1968.

GEOGRAPHICAL LOCATION: About 1km off the northeast coast of Tobago; 11°20'-11°22'N, 60°30'-60°33'W.

ALTITUDE: 0-105m.

AREA: 28.8 ha.

LAND TENURE: Public ownership (on condition it be maintained as a wildlife sanctuary).

PHYSICAL FEATURES: The island is steep sloped, rising to about 105m, and is covered with thick masses of cacti, low bush and trees.

VEGETATION: Most of the trees are deciduous, some being as high as 9m. There is no steady source of fresh water, and during the dry season the vegetation becomes extremely parched.

NOTEWORTHY FAUNA: The islands support one of the most important seabird breeding colonies in the southern West Indies, particularly as regards the larger species. The magnificent frigatebird or man-o-war *Fregata magnificens* and the red-footed booby *Sula sula* breed in some numbers on the main island, and there are also considerable colonies of brown boobies *Sula leucogaster*, noddy terns *Anous stolidus*, red-billed tropic birds *Phaethon aethereus* and Audubon's shearwaters *Puffinus ijerminieri*. Various other seabird species probably also breed on the main island or the outlying rocks, but breeding has not been confirmed to date. In addition 24 species of land-birds have been recorded from the main island.

ZONING: No entry without special permission.

DISTURBANCES OR DEFICIENCIES: Poaching.

SCIENTIFIC RESEARCH: Studies of bird life have been accomplished.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Dinsmore, J.J. and French, R.P. (1969). Birds of St Giles Islands, Tobago. Wilson Bulletin: 460-463.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(11) Saut d'Eau

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1935.

GEOGRAPHICAL LOCATION: The island lies less than 1km off Trinidad's north coast, due north of Maraval; 10°46'N, 61 31'W.

ALTITUDE: Sea level to 106m.

AREA: 10 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: Despite its size, the island rises fairly steeply to 106m with sheer, craggy cliffs at the shore. Landing may be effected at a sheltered spot to the south, but even this can be quite dangerous.

VEGETATION: Mainly deciduous forest typical of Trinidad's northwestern peninsula, but there are also considerable areas of low scrub and coarse grass with scattered thorn bushes (and a few large trees up to 18m in places).

NOTEWORTHY FAUNA: Saut d'Eau has been a wildlife sanctuary since 1935, in order to protect Trinidad's only breeding colony of brown pelicans *Pelicanus occidentalis*. These pelicans build large nests in the bigger trees and breed during the first half of the year. In a good year, perhaps 100 breeding pairs may raise young, but often the number is considerably smaller. The island's inaccessibility prevents much poaching but it also precludes protection through wardens. Apart from the pelicans, 26 other species of birds have been recorded on Saut d'Eau, many of them probably breeding. Of special interest is the chestnut-collared swift *Cypseloides rutilus*, which nests under overhanging cliffs a few feet above high tide level, and the rufous-necked wood-rail *Aramides axillaris*, which is rare in Trinidad.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Occasional poaching.

SCIENTIFIC RESEARCH: Studies of bird life have been accomplished.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: French, R.P. (1969). The Avifauna of Saut d'Eau Island, Journal of the Trinidad Field Naturalists Club.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(12) Kronstadt Island

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1940.

GEOGRAPHICAL LOCATION: Diego Martin ward, County of St George; 10°39'N, 61°37'W.

ALTITUDE: Sea level to 46m.

AREA: 4.8 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The island is irregular and knoblike in shape without any beaches. The soils are thin and reddish brown in colour. Outcrops of weathered limestone rock with hollowed portions and sharp projections are ubiquitous. There are no springs or streams and the rainfall is less than 135cm per annum, but some of the plants and weathered rocks are capable of collecting small amounts of water.

VEGETATION: Supports a low scrub forest consisting of hardy plants with spines and thick leaves. The principal species are several types of cacti, some shortboled naked indian trees *Bursera simaruba*, stunted cypre *Cordia alliodora* coppices, a few tree and ground orchids and a few savonnette *Lonchocarpus punctatus* and silk cotton trees *Ceiba pentandra*.

NOTEWORTHY FAUNA: A few species of birds have been seen on the island, including kiskadees *Pitangus sulphuratus*, screech owls *Otus choliba*, bananaquits *Coereba flaveola*, blue tanagers and the rufous-necked wood-rail *Aramides axillaris*. There are also many ground and tree lizards, particularly iguanas *Iguana iguana*, which inhabit the thick cacti growth interspersed with shrubby trees on the southeast portion of the island. Scorpions, and centipedes, were once common here, but are now rare.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Quarrying and poaching.

SCIENTIFIC RESEARCH: None known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Forestry Division, Ministry of Agriculture, Lands and Fisheries.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(13) Soldado Rock

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1934.

GEOGRAPHICAL LOCATION: 10km west of Icacos Point, on the extreme southwestern tip of Trinidad; 10°03'N, 62°00'W.

ALTITUDE: 36m.

AREA: 1 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: The island has an area of about 1 ha, but rises abruptly with steep rocky cliffs to 36m. It is mainly limestone, a very large boulder from the Eocene and Paleocene periods lying in younger beds, probably from the Miocene. The two main rock masses of the island are connected by a ridge, with silts heavily laden with guano from generations of sea bird colonies. Apart from its importance as the only major seabird breeding site belonging to Trinidad, Soldado Rock is of extreme interest to geologists, being the type locality for certain formations. Though it suffered considerable damage when it was used as a target for bombing and machine gun practice during World War II, it still has much to offer the geologist. In addition fossil beds may be seen in various places. Annual rainfall is low, probably less than 725cm, and in the dry season the island becomes extremely parched.

VEGETATION: The island is treeless, and the vegetation consists entirely of five species; the low shrub *Plumbago* is common on the sides of the ridge, and there are scattered plants of purslane *Portulaca* sp., two grasses and a sedge.

NOTEWORTHY FAUNA: The island's main attraction as a wildlife sanctuary is the sea bird colony. Two species in particular, the sooty tern *Sterna fuscata* and the brown noddy *Anous stolidus*, also a tern, nest in considerable numbers between March and July. The brown noddy nests on the rocks at the water's edge or on the cliff ledges. Though it is mostly absent during the day in the non-breeding months, many individuals return to roost on the island at night. Other seabirds include the large royal tern *Thalasseus maximus* and the sandwich tern *Thalasseus sanvicensis*, but their breeding has been sporadic. A common breeding land-bird is the gray-breast martin *Progne chalybea*, a swallow which nests in rock crevices in some hundreds, leaving the island by day to feed over Trinidad or Venezuela. Brown pelicans *Pelicanus occidentalis*, magnificent frigatebirds *Fregata magnificens* and brown boobies *Sula leucogaster* also roost on the island in variable numbers, and various other species visit the island intermittently, over 20 having been recorded altogether. The incidence of certain land-birds previously thought to be sedentary indicates a degree of local movement between Trinidad and the mainland of South America. In addition to the birds, the island has a small population of iguana lizards *Iguana iguana*, which prey on the terns, a small rat *Zygodontomys* sp., to which a new subspecies has recently been described from the island, and a variety of invertebrate fauna. The large toad or crapaud *Bufo marinus* has been found on the island, possibly introduced via the large floating islands of water-hyacinth which are swept into the Gulf of Paria from the river Orinoco when it floods early in the wet season.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Poaching.

SCIENTIFIC RESEARCH: None known.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: Sporadic patrols by game wardens.

BUDGET: No special allocation.

LOCAL PARK OR RESERVE ADMINISTRATION: Division of Forestry.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: March 1979.

(1) Buccoo Reef/Bon Accord Lagoon Restricted Area (Tobago)

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Proclaimed as a restricted area by the Government; the taking of fish and any species of other marine fauna is regulated under Act 39 of 1966 (ch. 25, no. 9). Act 1 of 1970 regulated entry.

DATE ESTABLISHED: About 1972.

GEOGRAPHICAL LOCATION: A reef located on a shallow shelf extending from the southwestern end of Tobago; 11°10'N, 60°50'W.

ALTITUDE: Sea level and below to 1 or 2m.

AREA: 650 ha.

LAND TENURE: Public ownership.

PHYSICAL FEATURES: An arc of reef extends from Sheerbird Point, Tobago, northwards and westwards, to approximately 1.6km north of Pigeon Point. This outer windward reef has a shallow rampart facing the prevailing NE-SW trade winds, and has only one break in the form of a channel near the northern end. The reef flat behind the breaker zone is extremely shallow with coral detritus forming islands in places at low tide. Sand-bottomed lagoonal flats with water averaging 2m in depth lie in a number of sharply defined basins which are devoid of living coral. The best stands of living coral occur on the northeastern windward reef facing Buccoo Bay. Bon Accord lagoon lies between the eastern end of Sheerbird Point and Pigeon Point and is partly landlocked.

VEGETATION: A remarkable forest of red mangrove *Rhizophora mangle* fringes Bon Accord Lagoon and forms a zone up to 70m wide with some trees being up to 15m high. This is either due to the age of the forest or to optimum growing conditions. A zone near Pigeon Point was damaged by Hurricane Flora and a further area has been cleared for development. The mangrove provides an important habitat for marine and terrestrial fauna. Extensive patches of turtle grass *Thalassia* spp. occur in Bon Accord Lagoon. *Halimeda opuntia* is an abundant alga on the reef and is an important sand building plant in the Buccoo Reef area.

NOTEWORTHY FAUNA: The fish fauna is typical of West Indian coral reefs including butterfly and angel fish (Chaetontidae), surgeon fish (Acanthuridae), trigger fish (Balistidae) and parrot fish (Scaridae). Larval forms of game fish are also common. Invertebrates include the spiny lobster *Palinurus argus* and queen conch *Strombus gigas*. Buccoo Reef is composed of dense elkhorn coral *Acropora palmata*, with large clumps of fire coral *Millepora complanata*. The fore-reef on the windward side has rich and varied populations of *Montastrea*, *Collophyllia* and *Siderastrea*, together with finger coral *Poritea furcata* and extensive staghorn coral *Acropora cervicornis*.

ZONING: None; the entire area is a strict nature reserve.

DISTURBANCES OR DEFICIENCIES: None reported.

TOURISM: Considerable numbers of visitors throughout the year. Boats (including those with glass bottoms) take visitors from Buccoo Bay and Store Bay to reef areas at low tide.

SCIENTIFIC RESEARCH: General surveys were conducted in 1967 and 1969. Studies have been carried out on reef structure, sedimentation and water movement; also remote sensing data analysis, part of a unique project using this technique for ecological planning.

SPECIAL SCIENTIFIC FACILITIES: These are available through the University of the West Indies, St. Augustine, Dept. of Biological Sciences.

PRINCIPAL REFERENCE MATERIAL: Environmental Systems Corporation. Remote Sensing Data Analysis for an Ecological and Planning Study for Bon Accord/Buccoo area, Tobago. E.S.C., PO Box 2525, Knoxville, Tennessee 37901.

Goreau, T.F. (1967). Buccoo Reef and Bon Accord Lagoon, Tobago, Observations. University of the West Indies, Mona, Jamaica. Report to the Ministry of Planning and Development, Trinidad.

Wood, H. (1964). Survey of Buccoo Reef. Fishery Research Dept., Ministry of Tobago Affairs.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Fisheries Division, Tobago, Trinidad and Tobago.

NAME OF CNPPA COORDINATOR: Bal Ramdial and Ken Thelen.

INFORMATION DATED: 1977.

TURKS AND CAICOS ISLANDS (UK)

AREA: 430 sq km land above water with a 8,580 sq km 'bank' between tideline and 100m fathom curve

POPULATION: 7,000 (1978) on 13 islands.

PARKS AND RESERVES LEGISLATION: The National Parks Ordinance and Regulations were approved by State Council in 1976. Control of parks is by the Chief Minister. There is no parks department; legislation is enforceable through the Fisheries Department and Department of Public Works. Marine and Land Park areas have been designated by the Temporary National Parks Commission; to date, State Council has not gazetted the list of parks, reserves and sanctuaries. Also relevant may be the Planning and Development Ordinance (1967), the Wild Birds Protection Ordinance (1916), and the Protection of Historic Wrecks (1974).

PARKS AND RESERVES ADMINISTRATION: Full responsibility for parks is under the Chief Minister subject to review by the British Governor. Marine Reserves are controlled via the Fisheries Department under the Fisheries Protection Ordinance of 1976.

ADDRESS: Chief Minister, National Parks Affairs, Government Office, Grand Turk, Turks and Caicos Islands, British West Indies.

TOTAL AREA UNDER PROTECTION: None officially.

PROTECTED AREAS: The following areas have been recommended:

As National Parks

Chalk Sound Cays, Providenciales
Five Cays
Conch Bar Caves, Middle Caicos
Iguana Cay, East Caicos Iguana Cay, East Caicos
Joe Grant's Cay, East Caicos
Long Cay, South Caicos
Six Hills Cays, South Caicos
Gibb, Penniston and Round Cays, Grand Turk
South Caicos Salinas, South Caicos

As Underwater National Parks

Whaley Cut and Northwest Reef, Providenciales
Blue Hills Reef
Leeward Going Through Reef
Bottle Creek Reef, North Caicos
Booby Rocks
South Caicos Harbour Reefs, South Caicos
Reefs between Penniston, East, and Pear Cays, Grand Turk
Hawkes Nest Reef, Grand Turk
North East Reef, part of Grand Turk

As National Reserves

All small cays south and south-east of Grand Turk in Great Sand Cay.
All cays less than ½ mile diameter in the Caicos Islands (not in White, French and Bush Cays mentioned elsewhere).
West Caicos Islands

As Wildlife Sanctuaries

White Cay, Bush Cay and French Cay, Caicos Islands
Small cays south end of Lorimer Creek, Middle Caicos
Three Marys Cays, North Caicos

U. S. A. - Florida

AREA: 151,670 sq km (about 20% of which is in the Neotropical Realm).

POPULATION: 8,421,000 (1976).

PARKS AND RESERVES LEGISLATION: National Parks and other categories of lands within the National Park system are established by individual acts of Congress, except National Monuments which can be created by the President on Federal lands, by proclamation under the authority of the Antiquities Act of 8 June 1906. The National Park Service was established by the act of 25 August 1916. State Parks and Reserves are established under separate state legislation.

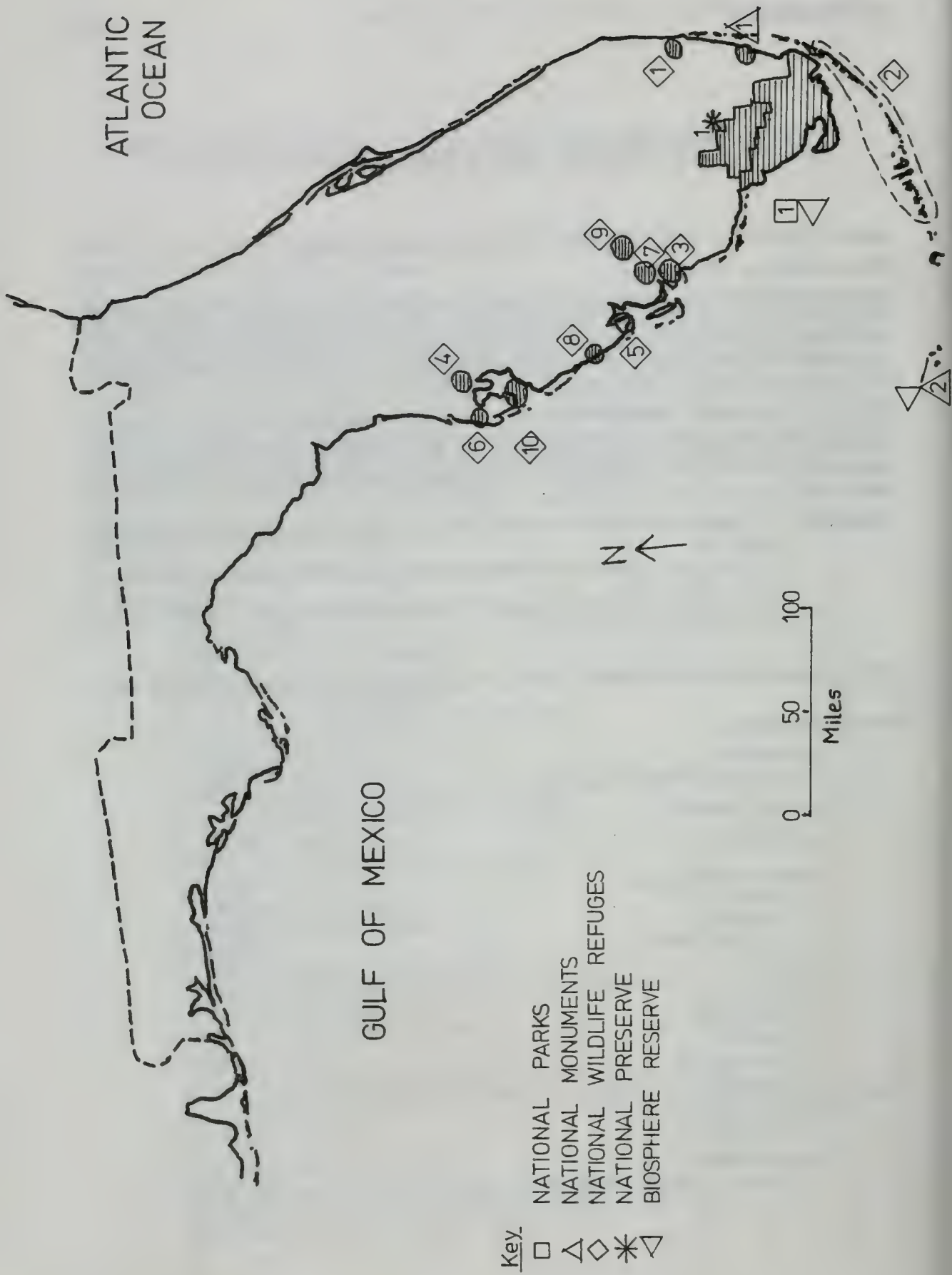
PARKS AND RESERVES ADMINISTRATION: Administrative and regulatory authority over the National Parks system is delegated to the National Parks Service through the Secretary of the Interior by the act of 25 August 1916 and subsequent acts of Congress (as set forth in Title 16, Code of Federal Regulation). The National Wildlife Refuges are administered by the US Fisheries and Wildlife Service, which is also responsible to the US Department of the Interior.

ADDRESS: (a) Director, National Park Service, US Department of the Interior, Washington DC 20240, USA.
(b) Southeast Regional Office, National Park Service, 75 Spring Street SW, Atlanta, Georgia 30303, USA.
(c) Division of Refuge Management, US Fish and Wildlife Service, 18th and C Streets NW, Washington DC 20240, USA.

TOTAL AREA UNDER PROTECTION: The total area protected in Florida in the Neotropical Realm is 692,208 ha.

PROTECTED AREAS:

National Park	(hectares)
1 Everglades (Word Heritage Site)	566,796
National Monument	
1 Biscayne	41,967
2 Fort Jefferson	19,083
National Wildlife Refuges	
1 Loxahatchee	62,897
2 Florida Keys	60,067
3 J.N. 'Ding' Darling	2,000
4 Pinellas	152
5 Pine Island	119
6 Egmont Key	101
7 Matlacha Pass	59
8 Island Bay	9
9 Caloosahatchee	4
10 Passage Key	4
National Preserve	
1 Big Cypress	566,796
Biosphere Reserve	
1 Everglades (includes Fort Jefferson)	585,867



(1) Everglades National Park

MANAGEMENT CATEGORY: II, IX & X (National Park, Biosphere Reserve & World Heritage Site).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 6 December 1947.

GEOGRAPHICAL LOCATION: Southern tip of Florida peninsula, 14km from Florida City. The park is bounded to the west by the Gulf of Mexico, on the south and southeast by the Florida Keys and includes most of the waters of Florida Bay. The Biosphere Reserve includes Fort Jefferson NM; 25°20'N, 81°W.

ALTITUDE: Sea level to 2m.

AREA: 566,796 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: The park is a shallow basin tilted to the southwest and underlain by extensive Pleistocene limestones with oolitic and bryozoan facies (the latter largely composed of *Schizoporella floridans*). The limestone is overlain with variable thicknesses of marl and peat, minimizing water loss downwards. Lake Okeechobee in the north overflows periodically, inundating two-thirds of the park. Florida Bay has over 2,000 sq km of water with an average depth of 1.5m and a maximum of 3m, composed geologically of anastomosing mudbanks and unconsolidated calcareous sediments over the limestones. It is one of the most active areas of modern carbonate sedimentation. Temperatures are moderate, rarely freezing in winter and reaching 21-35°C in summer, with annual precipitation often over 1270mm. Hurricane force storms occur.

VEGETATION: There are five vegetation types: hammocks or tree islands (8,100 ha) of mature hardwoods especially mahogany *Swietenia mahagoni*; mangrove forests (93,150 ha) of red mangrove *Rhizophora mangle*, *Laguncularia racemosa* and black mangrove *Avicennia nitida*; pinelands (8,505 ha,) on elevated limestone outcrops, with an admixture of local slash pine *Pinus elliotti* var. *densa*; bayheads (10,125 ha) with isolated stands in depressions or on slight elevations of species such as bald cypress *Taxodium distichum* or the willow *Salix caroliniana*; and in the north and east, sawgrass prairies and tree savanna (3,240 ha) dominated by sedge *Cladium jamaicensis*. There are also five types of aquatic vegetation, inland freshwater 'rivers' (188,325 ha) including flood savannas; small scattered ponds; brackish water marshes; coastal marshes (43,740 ha); and the marine sector with turtle grass *Thalassia testudinum*, shoal grass *Lanthera wrightii* and manatee grass *Syringodium filiforme* dominant. The more notable algae are *Caulerpa* in deeper water and the family Codiaceae, the latter playing an important role in calcifying the substrate for encrusting by Rhodophyceae and coralline algae.

NOTEWORTHY FAUNA: The Everglades protect 400 species of land and water vertebrates, excluding fish. 25 native mammals occur, including the round-tailed muskrat *Neofiber alleni struix*, mink *Mustela vison evergladensis*, Florida cougar *Felis concolor coryi* (E), the manatee *Trichechus manatus* (V). Over 300 bird species, many of limited distribution in the USA, have been recorded, notably the Everglades kite *Rostrhamus sociabilis* (R), short-tailed hawk *Buteo brachyurus*, bald eagle *Haliaeetus leucocephalus* (E), osprey *Pandion haliaetus*, peregrine *Falco peregrinus* (V), great white heron *Ardea herodias*, reddish egret *Dichromanassa rufescens*, wood ibis *Mycteria americana*, roseate spoonbill *Platalea ajaja*, mangrove cuckoo *Coccyzus minor* and many species typical of the Caribbean region. There are 60 known species of reptiles and amphibians, including the American alligator *Alligator mississippiensis*, the endangered American crocodile *Crocodylus acutus* (E) and Atlantic green turtle *Chelonia mydas mydas* (E).

ZONING: Strict natural areas and managed natural areas.

DISTURBANCES OR DEFICIENCIES: The park is largely undisturbed wilderness. Before its establishment lumbering and farming took place within the present boundaries, but the logged areas have recovered to a near natural state and the farmed areas are being reclaimed through a resource management programme. 30-50 park personnel and 50-120 concession personnel live in the park. Man-made structures consist mainly of housing, maintenance and administration buildings. A private concessionaire maintains a marina and a lodge. Water management has affected the park water supply, and population growth and urban development have affected water quality and wildlife habitats.

TOURISM: Over a million visitors a year from 1966-1978 and over 850,000 in 1979 and 1980. There are

campsites and trails. Each year about 24,000 students take part in Environmental Education programmes.

SCIENTIFIC RESEARCH: Although there has been extensive documented research on the natural resources of the Everglades, there are still several areas of critical resource management requiring study. Water management manipulations may be having extensive effects on animal and plant populations, fire behaviour, and the estuarine fisheries. The park immediately adjoins a large metropolitan area so resource management techniques are needed to alleviate pressures caused by urban growth. A research staff of about 20 scientists and technicians works on hydrology, wildlife and endangered species management, fire ecology, plant ecology, and fisheries. Fort Jefferson NM offers excellent research possibilities on coral reef ecology, bird migration, and fisheries; there is an excellent scientific data record for the Dry Tortugas.

SPECIAL SCIENTIFIC FACILITIES: A study collection and a reference library. A research building was due to be completed in 1977 and there are plans to implement a computerized data-information system.

PRINCIPAL REFERENCE MATERIAL: Over 100 reference works have been published, but there is no single comprehensive account of the natural history.

STAFF: 90 full-time, 45 part-time and 100 seasonal staff.

BUDGET: Approximately US\$ 5,000,000 for administration, protection, natural science studies, interpretation and maintenance in 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Everglades National Park, PO Box 279, Homestead, Florida 33030.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: January 1981.

(2) Fort Jefferson National Monument

MANAGEMENT CATEGORY: III (Natural Monument and Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1935.

GEOGRAPHICAL LOCATION: All of the Dry Tortugas Islands and the surrounding shoals and waters in the Gulf of Mexico, 110km west of Key West; 24°40'N, 82°52'W.

ALTITUDE: Sea level to 1.5m.

AREA: 19,071 ha, including 16 ha of land.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: The Dry Tortugas are a cluster of seven coral reefs. Soils are saline, and there is no fresh water on the islands. Temperatures are very hot, with long periods of drought and frequent storms. The Monument includes the ruins of the old garrison of Fort Jefferson.

VEGETATION: There are less than 50 species of native terrestrial plants, including buttonwood *Conocarpus erectus*, bay cedar, seagrass, sea lavender, purslane, and sea oats, all typical of the east coast of Florida. Introduced plants include coconut *Cocos nucifera*, date palms, tamarind, Australian pine, gumbo limbo and century.

NOTEWORTHY FAUNA: The marine life is rich and varied, and the islands were named after the great number of turtles originally found there. Although numbers have declined, green turtle *Chelonia mydas* (E), hawksbill *Eretmochelys imbricata* (E) and loggerheads *Caretta caretta* (V) can still be observed. Also found are terrapins, corals, several species of sponges, seafans, anemones, spiny lobsters and a great variety of reef fish. Larger fish include amberjack, grouper, wahoo, tarpon, shark and barracuda. The

keys, which lie across one of the principal flyways from the United States to South America, attract many migratory birds. A colony of about 100,000 sooty terns *Sterna fuscata* nests on Bush Key, together with a smaller colony of brown noddies *Anous stolidus*. Roseate terns *Sterna dougalli* occasionally also nest on Bush, Hospital and Long Keys. Other birds include frigatebirds, brown pelicans *Pelecanus occidentalis*, and occasionally blue-faced boobies and brown boobies *Sula leucogaster*.

ZONING: Bush Key is closed in the bird nesting season (March to September). All keys except Garden and Loggerhead Keys are closed during the turtle season (May to the end of September). The Fort Jefferson National Monument is part of the Everglade Biosphere Reserve.

DISTURBANCES OR DEFICIENCIES: None reported.

SCIENTIFIC RESEARCH: Green turtle hatchlings have been released on the Monument beaches in an effort to enlarge populations. The Monument offers excellent research possibilities on coral reef ecology, bird migration, and fisheries. There is an excellent scientific data record for the Dry Tortugas.

SPECIAL SCIENTIFIC FACILITIES: Modest accommodation is available.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: No information.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: The Superintendent, Everglades National Park, Box 279, Homestead, Florida 33030, USA.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: 1982.

(1) Loxahatchee National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Hunting and fishing are permitted.

DATE ESTABLISHED: 1951.

GEOGRAPHICAL LOCATION: Southeast of Lake Okeechobee in the south Florida Everglades; 26°30'N, 80°10'W.

ALTITUDE: 13-17 m.

AREA: 145,635 ha.

LAND TENURE: Federal government ownership and under lease from the state of Florida.

PHYSICAL FEATURES: The refuge is typical Everglade habitat, surrounded by levees established by SFWMD for flood control and water management.

VEGETATION: There are four vegetation types: three islands contain dahoon holly *Ilex cassine*, redbay *Persea borbonia* and wax myrtle *Myrica cerifera*; sawgrass communities; wet prairies with Tracey's beak rush *Rhynchospora tracyi*, *Eleocharis* spp. and maidencane *Panicum hemitomon*; and slough with white waterlily *Nymphaea odorata* and freshwater aquatics.

NOTEWORTHY FAUNA: There are 22 mammals, including the round-tailed muskrat *Neofiber alleni struix*, river otter *Lutra canadensis* and Florida cougar *Felis concolor coryi* (E), and approximately 250 species of birds, including the Everglade kite *Rostrhamus sociabilis* (E), osprey *Pandion haliaetus*, white heron *Ardea herodias*, wood ibis *Mycteria americana*, sandhill crane *Grus canadensis*. There are also approximately 50 species of reptiles and amphibians including alligator *Alligator mississippiensis* and eastern indigo snake *Drymarchon corais couperi*.

ZONING: There are managed public use areas, intensive management areas and closed natural areas.

DISTURBANCES OR DEFICIENCIES: The effects of flood control canals, pollution, the impact of pesticides and aquifer depletion resulting from agriculture, and the effects of population growth and urban sprawl.

SCIENTIFIC RESEARCH: Several studies are currently being undertaken with university and other collaboration.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Minor reference material.

STAFF: 12 permanent personnel and up to 6 seasonal temporary employees.

BUDGET: Approximately US \$366,000 for administration and maintenance; approx. US \$700,000 in current constitution contracts.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, Loxahatchee NWR, Route 1, Box 278, Boynton Beach, Florida 33437.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

(3) Florida Keys National Wildlife Refuges:

National Key Deer Refuge
Great White Heron National Wildlife Refuge
Key West National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4. (Everglades).

LEGAL PROTECTION: Resource is protected, but non-consumption use such as wildlife observation and photography is allowed.

DATE ESTABLISHED: National Key Deer Refuge - 1 February 1954; Great White Heron NWR - 27 October 1938; Key West NWR - 8 August 1908.

GEOGRAPHICAL LOCATION: All three refuges are located in the Lower Florida Keys, Monroe county, Florida; 81°N, 24°W.

ALTITUDE: Sea level to 3m.

AREA: 60,066.82 ha.

LAND TENURE: All land is owned by the federal government, with the exception of 302.33 ha leased from the National Audubon Society.

PHYSICAL FEATURES: The Florida Keys are situated on a large coral reef comprised of Miami oolite limestone and Key Largo limestone. This rock is covered by 2.5-5cm of top soil. The Keys climate is tropical and frost-free, with temperatures very seldom dropping below 8°C. Rainfall averages around 1,150mm per year with the majority falling between April and October.

VEGETATION: There are four distinct plant communities. Mangrove swamps (2,753.27 ha) consist almost entirely of red mangrove *Rhizophora mangle*. Buttonwood/mangrove shrublands (417.63 ha) contain buttonwood *Conocarpus erectus*, white mangrove *Laguncularia racemosa* and black mangrove *Avicennia germinans*. Hardwood hammocks (approximately 143.72 ha) contain gumbo limbo tree *Bursera simaruba*, Florida poison tree *Metopium toxiferum*, sea grape *Coccoloba uvifera* and blackbead *Pithecellobium unguis-cati*. The pine hammocks (574.89 ha) are comprised of slash pine *Pinus caribbaea*, brittle thatch palm *Thrinax microcarpa* and Florida silver palm *Coccothrinax argentata*.

NOTEWORTHY FAUNA: Seven threatened species can be found on the refuges, 350-400 key deer

Odocoileus virginianus clavium (R), 10 southern bald eagle *Haliaeetus leucocephalus leucocephalus* (E), 8,000 eastern brown pelican *Pelecanus occidentalis carolinensis*, 10 peregrine falcon *Falco peregrinus* (V), 200 American alligator *Alligator mississippiensis*, 4 American crocodile *Crocodylus acutus* (E), and 125 eastern indigo snake *Drymarchon corais couperi*. Florida manatee *Trichechus manatus* (V) is found in the water surrounding the refuge. Mammals indigenous to the keys include racoon *Procyon lotor incatus*, marsh rabbit *Sylvilagus palustris*, eastern woodrat *Neotoma floridana*, cotton rat *Sigmodon hispidus* and black rat *Rattus rattus*. Over 250 species of birds use the refuge, including great white heron *Ardea herodias*, reddish egret *Dichromanassa rufescens*, roseate spoonbill *Platalea ajaja*, white-crowned pigeon *Columba leucocephala* and mangrove cuckoo *Coccyzus minor*. There are 28 species of reptiles and amphibians, including five endangered species of sea turtles, Atlantic Ridley *Lepidochelys kemp* (E), Atlantic loggerhead *Caretta caretta caretta* (V), Atlantic green *Chelonia mydas mydas* (E), Atlantic leatherback *Dermochelys coriacea coriacea* (E) and Atlantic hawksbill *Eretmochelys imbricata imbricata* (E). Local types include mangrove water snake *Natrix fasciata compressicauda*, Key mud turtle *Kinosternon bauri bauri* and mangrove terrapin *Malaclemys terrapin thizophoratum*.

ZONING: Approximately 2,490.28 ha have been set aside as a Wilderness Area.

DISTURBANCES OR DEFICIENCIES: Development and population growth of the surrounding area have hampered refuge operations. Public use disturbances such as camping, littering and feeding of wildlife, along with unauthorized use of insecticides for mosquito control, have all become an increasing problem.

TOURISM: Over 74,000 visitors during 1980.

SCIENTIFIC RESEARCH: One research project is currently being conducted, but several more are planned for the future with most centring on key deer research.

SPECIAL SCIENTIFIC FACILITIES: The refuges have a small herbarium containing approximately 500 specimens and a very small reference library.

PRINCIPAL REFERENCE MATERIAL: The largest collection of publications, research papers etc. can be found in the refuge reference library.

STAFF: 3 permanent full-time employees, 1 permanent part-time employee and 1 temporary employee (1 year term).

BUDGET: Over US \$148,000 for 1981.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, National Key Deer Refuge, PO Box 510, Big Pine Key, FL 33043.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

(3) J.N. 'Ding' Darling National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Fishing, crabbing and oystering permitted.

DATE ESTABLISHED: December 1945.

GEOGRAPHICAL LOCATION: Sanibel, Lee county, Florida; 25°26'N, 82°05'W.

ALTITUDE: Sea level to 3m.

AREA: 2,000 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: The refuge consists mostly of mangroves, swamp, marshes, saltwater bays

and mudflats, much of the area being covered by daily tides. Bailey Tract (40 ha) consists of freshwater marsh and impoundments. Perry Tract (1.4 ha) consists of beach, marsh, water and forest. The Point Ybel area has sandy uplands with trees and 4,000ft of beach. The underlying sediment is composed of shell, sand and silt. Temperature is warm most of the year, varying from 37°C in summer to below 0°C in winter, and the area is subject to hurricane force winds.

VEGETATION: There are six vegetation types. Beach and strand vegetation (2%) consists of plants adapted to changing conditions and salt spray such as *Atriplex arenaria*, *Chamaesyce mesembryanthemifolia*, *Cenchrus incertus*, *Dactyloctenium arenaria*, *Iva imbricata*, *Sporobolus virginicus*, *Uniola paniculata*, *Yucca aloifolia*, *Caesalpinia bonduc*, *Dalbergia ecastophyllum*, *Lantana involucrata*, *Suriana maritima* and *Scaevola plumieri*. Mangrove forest (85%) is dominated by red mangrove *Rhizophora mangle*, white mangrove *Laguncularia racemosa*, black mangrove *Avicennia germinans* and *Conocarpus erecta*. Freshwater marsh (5%) contains Brazilian pepper *Schinus terebinthefolius*, *Acrostichum damacaeefolium*, *Cladium jamaicense*, *Spartina bakeri*, *Typha angustifolia* and *Typha domingensis*. Coastal dry hammock (4%) is dominated by live oak *Quercus virginiana*, cabbage palm *Sabal palmetto*, sea grape *Coccoloba uvifera*, gumbo limbo *Bursera simaruba* and strangler fig *Ficus aurea*, and other common plants are *Polypodium polypodioides*, *Tillandsia usneoides*, *T. utriculata*, *T. fasciculata*, *Encyclia tampensis* and *Vittaria lineata*. Tropical hammocks are characterized by tropical hardwood trees which include *Bursera simaruba*, *Mastichodendron foetidissimum*, *Coccoloba uvifera*, *Delonix regia*, *Zanthoxylum fagara* and *Citrus aurantiifolia*, all of which are scattered randomly, and shrubs such as *Ardisia escallonioides*, *Capparis cynophallophora*, *Chiococca alba*, *Erythrina herbacea*, *Pithecellobium unguis-cati* and *Randia aculeata*. The ruderal community areas (4%) are disturbed sites and contain plants such as *Baccharis halimifolia*, *Bidens pilosa*, *Hyssopifolia* sp., *Chloris glauca*, *Cyperus ligularis*, *Physalis angustifolia*, Brazilian pepper *Schinus terebinthefolius* and *Vigna luteola*.

NOTEWORTHY FAUNA: Mammals occurring in the refuge include the racoon *Procyon lotor*, opossum *Didelphis marsupialis*, otter *Lutra canadensis*, manatee *Trichechus manatus* (V) and armadillo *Dasypus novemcinctus*. Reptiles found include American alligator *Alligator mississippiensis*, American crocodile *Crocodylus acutus* (E), Atlantic loggerhead turtle *Caretta caretta* (V), gopher tortoise *Gopherus polyphemus* (V) and eastern indigo snake *Dymarchon carais couperi*. The most notable of the avifauna are the brown pelican *Pelecanus occidentalis*, mottled duck *Anas fulvigula*, bald eagle *Haliaeetus leucocephalus* (E), osprey *Pandion haliaetus*, reddish egret *Dichromanassa rufescens*, wood stork *Mycteria americana*, roseate spoonbill *Platalea ajaja*, sandwich tern *Thalassus sandvicensis*, black skimmer *Pynchops nigra*, mangrove cuckoo *Coccyzus minor*, smooth-billed ani *Crotophaga ani*, grey kingbird *Tyrannus dominicensis* and black-whiskered vireo *Vireo altiloquus*.

ZONING: The refuge boundary and wilderness areas are identifiable.

DISTURBANCES OR DEFICIENCIES: The use of heavy equipment to eradicate dense stands of Brazilian pepper leaves areas temporarily bare of vegetation.

TOURISM: 750,000 visitors annually.

SCIENTIFIC RESEARCH: A study of bird usage, submerged vegetation, mangrove growth and fish habitation of the refuge impoundment is being carried out by refuge personnel. A collection of fish specimens is currently being undertaken.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Six full-time, two part-time and one temporary employee.

BUDGET: US\$ 173,000 annually.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957, USA.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: January 1981.

(4) Pinellas National Wildlife Refuge

MANAGEMENT CATEGORY: IV (National Wildlife Refuge).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 18 January 1956.

GEOGRAPHICAL LOCATION: Tampa Bay, Pinellas county, Florida; 27°41'N, 82°41'W.

ALTITUDE: Sea level to 2m.

AREA: 152 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: This refuge consists of two mangrove islands, Tarpon and Indian Keys. Both have been altered by mosquito control activity and spoil from adjacent channel dredging. Some exotic plants have encroached on the various spoil sites.

VEGETATION: 75% red mangrove *Rhizophora mangle*, 25% black mangrove *Avicennia germinans*, 1% Washington palm *Washingtonia robusta*, 1.5% Australian pine *Casuarina equisetifolia*, 1.5% Brazilian pepper *Schinus terebinthefolius*.

NOTEWORTHY FAUNA: Tarpon Key is a nesting rookery for eastern brown pelicans *Pelecanus occidentalis*, cormorants *Phalacrocorax penicillatus*, great egrets *Egratta alba*, snowy egrets *Leucophoyx thula*, great blue heron *Ardea herodias*, little blue herons *E. caerulea* and Louisiana herons *E. tricolor*.

ZONING: The boundary of this refuge is marked by signs.

DISTURBANCES OR DEFICIENCIES: Occasional disturbance by boats approaching too close to the keys.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: An assistant refuge manager is stationed in the area and is responsible for the day-to-day administration of this refuge.

BUDGET: Funded by J.N. 'Ding' Darling NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

(5) Pine Island National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1908.

GEOGRAPHICAL LOCATION: Pine Island, and other neighbouring islands, Florida; 26°40'N, 81°17'W.

ALTITUDE: 0-2m.

AREA: 118.8 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: This refuge is composed of several islands with upland ridges and low-lying mangrove areas that are flooded daily. The temperature is warm most of the year. The area is subject to hurricane force winds.

VEGETATION: Red mangrove *Rhizophora mangle*, black mangrove *Avicennia germinans* and Brazilian pepper *Schinus terebinthifolius* are the dominant plants.

NOTEWORTHY FAUNA: Brown pelicans *Pelecanus occidentalis* nest by the hundreds in this refuge.

ZONING: The refuge boundary is identifiable.

DISTURBANCES OR DEFICIENCIES: Dense growth of Brazilian pepper crowds out native plants on the upland ridges.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Administered by the staff of J.N. 'Ding' Darling National Wildlife Refuge.

BUDGET: Funded by the above Refuge.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: January 1981.

(6) Egmont Key National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 10 July 1974.

GEOGRAPHICAL LOCATION: At the entrance to Tampa Bay, Hillsborough county, Florida; 27°36'N, 82°45'W.

ALTITUDE: Sea level to 3m.

AREA: 101.17 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: A barrier island which has been completely altered. This island was developed into Ford Dade in the Spanish-American War era. It is laced with old roads and cluttered with crumbling buildings and fortifications. Completely surrounded by good beaches, the island is a popular recreational area.

VEGETATION: 17% sea oats *Uniola paniculata*, 65% cabbage palms *Sabal palmetto*, 10% coin vines *Dalbergia ecastophyllum*, 8% Australian pine *Casuarina equisetifolia*.

NOTEWORTHY FAUNA: Loggerhead turtle *Caretta caretta* (V), Florida box turtle *Terrepene carolina bauri*, gopher tortoise *Gopherus polyphemus* (V) and eastern diamondback rattlesnake *Crotalus adamanteus*. Brown pelicans *Pelecanus occidentalis* and a variety of wading birds utilize the beaches.

ZONING: The boundary of this refuge is marked with official boundary signs.

DISTURBANCES OR DEFICIENCIES: Two exotic plants, *Casuarina* and *Schinus*, are encroaching on the habitat. This invasion is restricting the growth of native species. Public use is damaging the dune ecosystem.

SCIENTIFIC RESEARCH: An archaeological survey was conducted by staff from the University of South Florida in 1977.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: An archaeological survey of Egmont Key National Wildlife Refuge, Hillsborough County, Florida (refuge files).

STAFF: Administered by the staff of J.N. 'Ding' Darling NWR.

BUDGET: Funded by the above Refuge.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

(7) Matlacha Pass National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1908.

GEOGRAPHICAL LOCATION: Florida; 26°00'N, 82°02'W.

ALTITUDE: 0-2m.

AREA: 59.2 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: Small islands in salt water habitat.

VEGETATION: Red mangrove *Rhizophora mangle* is the dominant plant.

NOTEWORTHY FAUNA: Brown pelican *Pelecanus occidentalis* nest here.

ZONING: The refuge boundary is identifiable.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Administered by the staff of J.N. 'Ding' Darling NWR.

BUDGET: Funded by the above Refuge.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: January 1981.

(8) Island Bay National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 23 October 1908.

GEOGRAPHICAL LOCATION: On the north side of Charlotte Harbour, Charlotte county, Florida; 24°46'N, 82°11'W.

ALTITUDE: Sea level to 5m.

AREA: 8.09 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: Upland portions of a small island chain and two Caloosa Indian middens.

VEGETATION: 35% cabbage palm *Sabal palmetto*, 10% sea grape *Coccoloba uvifera*, 5% false mastic *Mastichodendron foetidissimum*, 10% gumbo limbo *Bursera simaruba*, 5% nicker bean *Caesalpinia crista*, 10% sea oxeye *Borrchia frutescens*, 5% prickly pear *Opuntia stricta*, 10% black mangrove *Avicennia germinans*, 5% coin vine *Dalbergia ecastophyllum*, 5% cat claw *Pithecellobium unguis-cati*.

NOTEWORTHY FAUNA: The refuge is used primarily as a daytime roosting site by colonial nesting birds.

ZONING: The boundary of this refuge is marked with official boundary signs. It is a component of the National Wilderness System.

DISTURBANCES OR DEFICIENCIES: The exotic plants *Schinus* and *Casuarina* are encroaching but control measures are being carried out.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Administered by the staff of J.N. 'Ding' Darling NWR.

BUDGET: Funded by the above Refuge.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

(9) Caloosahatchee National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1908.

GEOGRAPHICAL LOCATION: Florida; 26°40'N, 81°48'W.

ALTITUDE: 0-3m.

AREA: 4 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: This refuge consists of three islands of fresh, brackish water habitat with upland ridges.

VEGETATION: Cabbage palm *Sabal palmetto*, sea grape *Coccoloba uvifera*, prickly pear *Opuntia compressa*, red mangrove *Rhizophora mangle*, white mangrove *Laguncularia racemosa* and black mangrove *Avicennia germinans* are the dominant plants.

NOTEWORTHY FAUNA: Alligators *Alligator mississippiensis* have been known to use this refuge.

ZONING: Boundary areas are clearly marked.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: Administered by the staff of J.N. 'Ding' Darling NWR.

BUDGET: Funded by the above Refuge.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: January 1981.

(10) Passage Key National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.12.4 (Everglades).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 10 October 1905.

GEOGRAPHICAL LOCATION: Tampa Bay, Manatee county, Florida; 27°33'N, 82°44'W.

ALTITUDE: Sea level to 1m.

AREA: 4.04 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: A low, constantly shifting sandbar, variable in size depending on the dynamics of Passage Key Shoals.

VEGETATION: At times this refuge is devoid of vegetation, but on occasions the following species have been observed: sea oats *Uniola paniculata*, railroad vine *Ipomoea pes-caprae*, sea purslane *Sesuvium portulacastrum*, Australian pine *Casuarina equisetifolia*, red mangrove *Rhizophora mangle* and black mangrove *Avicennia germinans*.

NOTEWORTHY FAUNA: The following species are known to nest on this refuge: black skimmer *Rhynchops nigra*, least tern *Sterna albifrons*, American oystercatcher *Haematopus palliatus*, laughing gull *Larus atricilla* and loggerhead turtle *Caretta caretta* (V).

ZONING: The boundary of this refuge, which is a component of the National Wilderness System, is marked. The refuge is closed to public landing annually from 1 April to 1 September.

DISTURBANCES OR DEFICIENCIES: Occasional high storm tides inundate the refuge and destroy bird production.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: An assistant refuge manager is stationed in the area and is responsible for the day-to-day administration of this refuge.

BUDGET: Funded by J.N. 'Ding' Darling NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, J.N. 'Ding' Darling National Wildlife Refuge, PO Drawer B, Sanibel, Florida 33957.

NAME OF CNPPA COORDINATOR: R. Milne.

INFORMATION DATED: February 1981.

URUGUAY

AREA: 186,925 sq km.

POPULATION: 2,864,000 (1978).

PARKS AND RESERVES LEGISLATION: Protection of all parks, monuments and forests is controlled from the Forestry Law of 16 November 1968. Decree 269/967 of 27 April 1967 incorporates the National Park Department into the Ministry of Agriculture (Ministerio da Ganaderia y Agricultura) under the title Direccion Forestal, Parques y Fauna. This Department is in charge of all the national parks and monuments, apart from Santa Teresa and San Miguel, which come under the Ministerio de Defensa Nacional. The Department has the right to expropriate lands, and to inspect and seize vehicles, instruments and arms employed in illicit activities.

PARKS AND RESERVES ADMINISTRATION: There are various types of protected forest in Uruguay, along with lands declared as national parks and monuments. National Parks are defined as areas set aside for tourism, recreation, science and culture and which cannot be exploited except to further these aims. The Direccion Forestal, Parques y Fauna has the ultimate authority for management of territory within national parks.

ADDRESS: Direccion Forestal, Parques y Fauna, Ministerio de Ganaderia y Agricultura, Montevideo, Uruguay.

TOTAL AREA UNDER PROTECTION: 30,593 ha.

PROTECTED AREAS:

	(hectares)
National Park	
1 Arequita	1,000
National Monuments	
1 Costa Atlantica	14,250
2 Dunas	1,000
Natural Monuments and Parks	
1 Santa Teresa*	3,290
2 San Miguel*	1,238
Fauna Refuge	
1 Laguna Castillos	8,000
National Forest	
1 Rio Negro	1,815
Biosphere Reserve	
1 Banados del Este	(200,000)

(1) Arequita

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Uruguayan Pampas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964.

GEOGRAPHICAL LOCATION: 10km north of Minas, Lavalleja Province; 34°12'S, 55°13'W.

ALTITUDE: 40-240m.

AREA: 1,000 ha.

LAND TENURE: Government expropriated land; some land still in course of expropriation.

PHYSICAL FEATURES: Two flat-topped mountains separated by the upper reaches of the Santa Lucia river are a main feature of the area. The geology of the area is of interest and there are a number of caverns in various parts of the Park. The mountains are composed of quartzite.

VEGETATION: The flora is indigenous, with a notable forest of *Phytolacca dyaica*. Much of the area has been grazed and has been invaded by myrtle, mimosa and algaroba *Prosopis* spp.

NOTEWORTHY FAUNA: These include crab-eating raccoon *Procyon cancrivorus*, grison *Galictis cuja furonax*, La Plata otter *Lutra platensis* (V) and pampas deer *Ozotocerus bezoarticus* (V).

ZONING: None as yet but proposed zones include a recreation zone, an intensive use zone and a wilderness zone.

DISTURBANCES OR DEFICIENCIES: None reported at present.

SCIENTIFIC RESEARCH: Mainly on geology. A vegetation study is being undertaken.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: 6 guards and workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Intendent, Parque Nacional Arequita, Direccion Forestal, Parques y Fauna, Ministerio de Ganaderia y Agricultura, Montevideo, Uruguay.

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: 1977.

(1) Costa Atlantica

MANAGEMENT CATEGORY: III (National Monument).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Uruguayan Pampas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 16 September 1942, by Decree as Cabo Polonio National Park. Extended 2 June 1966 by decree No. 266/966.

GEOGRAPHICAL LOCATION: On Cabo Polonio, on the Atlantic coast, Rocha Province; 34°20'S, 53°30'W.

ALTITUDE: Sea level to 60m.

AREA: 14,250 ha. (along 26km. of coast line).

LAND TENURE: 80% of the area is private land under expropriation.

PHYSICAL FEATURES: The boundaries extend from the Atlantic Ocean to the eastern shore of Laguna Castillos. Most of the area consists of sand dunes, reaching 60m in height. There are some swampy dune slacks and long beaches of white sand border the sea, culminating at the cape where there is a lighthouse and a sealing station. There are several small offshore islands.

VEGETATION: An area of marshland has been designated as a faunal reserve. Another area, set aside as a forest reserve, has been planted for dune stabilization and timber production with Corsican pine *Pinus maritima*.

NOTEWORTHY FAUNA: Mammals include Azara's opossum *Didelphis azarae*, six-banded armadillo *Euphractus sexcinctus*, capybara *Hydrochoerus hydrochaeris*, coypu *Myocastor coypus*, lesser grison *Galictis cuja*, La Plata otter *Lutra platensis* (V), tiger cat *Felis geoffroyi* (V), margay *F. wiedii* (V) and pampas cat *F. colocolo*. Marine mammals include South American sea-lion *Otaria byronia* and fur seal *Arctocephalus australis*. The marsh deer *Blastoceros dichotomus* (V) and pampas deer *Ozotoceros bezoarticus* (E) are also present. More than 150 bird species have been recorded, including the rhea *Rhea americana intermedia*, grebes *Podiceps rolland chilensis*, *P. major* and *Podilymbus podiceps*, magnificent frigate bird *Fregata magnificens*, whistling heron *Syrigma sibilatrix*, greater flamingo *Phoenicopterus ruber*, black-necked swan *Cygnus melancoryphus*, tree ducks *Dendrocygna bicolor* and *D. viduata*, 10 other duck species (Anatidae), 9 species of raptor, a wide range of shorebirds such as two-banded plover *Charadrius falklandicus*, red knot *Calidris canutus* and Wilson's phalarope *Steganopus tricolor*, gulls (Laridae), kingfishers (Alcedinidae) and numerous passerines including some sparsely distributed species such as the marsh seedeater *Sporophila palustris*.

ZONING: i) National Dune Monument; ii) reafforestation and stabilization zone; iii) faunal reserve of lake and marshes; iv) beach zone with settlement and sealing.

DISTURBANCES OR DEFICIENCIES: The coypu are hunted for fur, grazing takes place and the sea-lions are exploited. Fishing is also allowed.

SCIENTIFIC RESEARCH: Studies of sea-lion biology, wildlife research, introduction of new species, archaeology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: One forestry engineer responsible for the land area; labour force of 11.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Supervisor, Jefe de Distrito Forestal IV, Direccion Forestal, Parques y Fauna, Ministerio de Ganaderia y Agricultura.

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: 1977.

(1) Santa Teresa

MANAGEMENT CATEGORY: III (National Monument).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Uruguayan Pampas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1927.

GEOGRAPHICAL LOCATION: Rocha Province, Atlantic coast, 40 km northeast of Castillos; 33°58'S, 53°29'W.

ALTITUDE: Sea level to 50m.

AREA: 3,290 ha.

LAND TENURE: Government expropriated lands.

PHYSICAL FEATURES: An area between the sea and the Laguno Difunto o Negra, originally reserved for dune stabilization. There are some beautiful beaches and a main feature is a well maintained fortress dating from the 18th century colonial war. Monthly mean temperatures range from 10°C to 22°C.

VEGETATION: Almost entirely made up of exotic species including pines *Pinus* spp., *Eucalyptus* spp., palms and many others. However, there are still some areas of marshland supporting original vegetation.

NOTEWORTHY FAUNA: Species still able to survive in the plantations and marshland include capybara *Hydrochoerus hydrochaeris*, coypu *Myocastor coypus*, La Plata otter *Lutra platensis* (V), mongay *Felis wiedii* (V) and brocket deer *Mazama simplicornis*.

ZONING: A zone for cattle production and an administrative zone; the whole area is open to visitors.

DISTURBANCES OR DEFICIENCIES: Occasional forest fires; many introduced plant species.

SCIENTIFIC RESEARCH: Mainly on archaeology.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Arredondo, H. (1958). Santa Teresa y San Miguel. La restauracion de las fortalezas, la formacion de sus parques. El Siglo, Montevideo, Uruguay.

Martinez, M.V. (1947). Los fantasmas de Santa Teresa: evocaciones de Rocha. Barriero y Ramos, Montevideo, Uruguay.

STAFF: Administered by an honorary commission with 5 members (2 civilian and 3 military). 85 military and civilian workers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Parque Nacional Santa Teresa, Ministerio de la Defensa Nacional, Montevideo, Uruguay.

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: 1977.

(2) San Miguel

MANAGEMENT CATEGORY: III (National Monument).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Uruguayn Pampas).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1927.

GEOGRAPHICAL LOCATION: 10km west of the Brazilian border town of Chui and 15km from the Atlantic coast, Rocha province; 33°41'S, 53°30'W.

ALTITUDE: 20-60m.

AREA: 1,238 ha.

LAND TENURE: Government expropriated lands by law.

PHYSICAL FEATURES: A hilly and stony area, situated between the rivers flowing into the southern end of the vast Lagoa Mirim. The park includes a well-restored fort dating from the 18th century boundary disputes between Spain and Portugal.

VEGETATION: The vegetation consists mainly of xerophytes but has been considerably modified by very many years of grazing by introduced domestic stock. Species include urunday *Astronium urundeuva* and quebracho *Schinopsis* spp., both belonging to the Anacardiaceae. There are also a number of exotic species.

NOTEWORTHY FAUNA: Capybara *Hydrochoerus hydrochaeris*, coypu *Myocastor coypus* and Azara's fox *Dusicyon gymnocercus* still occur. A breed of domestic criollo maintained in the area.

ZONING: None yet established.

DISTURBANCES OR DEFICIENCIES: Some illegal hunting, grazing and trapping of coypu for fur.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Arredondo, H (1958). Santa Teresa y San Miguel, La restauracion de las fortalezas, la formacion de sus parques. El Siglo, Montevideo, Uruguay. Illustrated.

STAFF: Varies from 8-9 in summer to 19-20 in winter (1973). This is made up of both the military and labourers.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Parque Nacional San Miguel, Ministerio de la Defensa Nacional, Montevideo, Uruguay. (Park is administered by an honorary commission of 5 members.)

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: 1977.

(1) Banados del Este

MANAGEMENT CATEGORY: IX (Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.32.11 (Uruguayan Pampas).

LEGAL PROTECTION: This area is said to contain some 30,500 ha in National Parks that are governed by law no. 9841 (4 July 1935) concerning the protection of flora and fauna. It is unclear to which areas this refers.

DATE ESTABLISHED: June 1976 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: In eastern Uruguay, on the Brazilian frontier; 32°-35°S, 53°-55°W.

ALTITUDE: 0-50m.

AREA: 200,000 ha.

LAND TENURE: 30% state property; 70% privately owned.

PHYSICAL FEATURES: Four important rivers flow through Banados del Este into the Merim Lagoon; the Yaguatón, Tacuari, Olimar and San Luis. Grey pansol fields, normally under water, produce a great floral variety. The soils are peaty with high acidity. Annual average rainfall in the zone is 1100mm, most abundant in winter, and the temperature ranges between 8°C and 28°C.

VEGETATION: This is the only area in the country where the 'butia' palms *Butia yatay* growing in these soils are protected. They form an almost pure association. Dominant in the herbaceous community are Cyperaceae, Juncaceae, Gramineae (*Scirpus californicus*, *Typha* spp., *Zizaniopsis bonaerensis*, *Scirpus giganteus* etc.). There are also a variety of psammophilous plants and extensive stands of the conifer *Pinus atlantica* along the coast.

NOTEWORTHY FAUNA: The indigenous fauna remains almost intact except that the marsh deer *Blastocerus dichotomus* is now locally extinct. There are large colonies of coypu *Myocastor coypus* and capybara *Hydrochoerus hydrochoeris*, while giant otter *Pteronura brasiliensis* (V) are less abundant. Perhaps more important, however, is the tremendous wealth of the avifauna, which includes species such as the red-legged seriema *Caraima cristata*, black-necked swan *Cygnus melanocoryphus*, coscoroba swan *Coscoroba coscoroba* and muscovy duck *Cairina moschata*. In addition, this zone is one of the most important in the southern hemisphere for the study of migratory birds in their movements from north to south. Examples are the American golden plover *Pluvialis dominica dominica* from the Arctic, the albatross *Diomedea* sp., the petrels (Procellariidae) and the penguins (Spheniscidae).

ZONING: None.

DISTURBANCES OR DEFICIENCIES: The ecosystem is threatened with serious changes as stock raising gradually gives way to rice-growing. This has led to an attempt to dry the lake areas and alter the water levels in the flood zones. Uncontrolled tourism is also exerting increasing pressure. The implementation of a plan to channel the lagoons and marshes flowing into the sea would have irreversible consequences for the environment.

SCIENTIFIC RESEARCH: Among the basic problems, concerning which an ambitious plan for research has been undertaken, the following may be mentioned: a) dry-season pastures for the development of stock raising; b) water regulation in periods of flooding and drought; c) control of bird migration and reintroduction of extinct species; d) epidemiological research into furuncular myiasis. All this ecological research is important for the countries in the temperate zone having wetlands.

SPECIAL SCIENTIFIC FACILITIES: The whole area of the eastern marshes is provided with a good road network and accommodation facilities for groups of scientists working there.

PRINCIPAL REFERENCE MATERIAL: Instituto Nacional para la Preservacion del Medio Ambiente (1973). Informe sobre 'Banados de Rocha'.

Melendo, Mariano (1974). Informe Mision Espanola.

Sombroek, W.G. (1969). Soil studies in the Merim Lagoon basin.

STAFF: A small technical staff is available for isolated studies.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Presidente, Instituto Nacional para la Preservacion del Medio Ambiente, s/c Luis Cavia 3046, Montevideo, Uruguay.

NAME OF CNPPA COORDINATOR: Jorge Morello.

INFORMATION DATED: Derived from information from Unesco.

VENEZUELA

AREA: 912,047 sq km.

POPULATION: 13,122,000 (1978).

PARKS AND RESERVES LEGISLATION: The conservation and utilization of natural resources in Venezuela is controlled under the Forstry, Soils and Water Law of 30 December 1965. This gives the Council of Ministers the power to establish protected areas by Executive Decrees, which can only be reversed by Congressional Act. The law also includes a clause specifying procedures, penalties and sanctions. This law is regulated by Decree 1333 of 11 February 1969. Decree 2117 of 12 April 1977 partially reformed this Regulatory Law. The Organic Environment Law of 7 June 1976 established conservation as an important factor in the development of the country, stating that conservation, defence and improvement of the environment will include:

'The creation, protection, conservation and improvement of national parks, forest reserves, natural monuments, protected zones, virgin region reserves, watersheds, national hydrological reserves, refuges, sanctuaries and reserves of wildlife, recreation parks of open-air or intensive use, green areas in urban centres or any other land area subject to a special regime in benefit of the ecological equilibrium and of the collective well-being'.

In April 1977 the Ministry of the Environment and Natural Renewable Resources was established, and on 13 October 1977 the Direccion de Parques Nacionales within that Ministry.

PARKS AND RESERVES ADMINISTRATION: The Direccion de Parques Nacionales is responsible for the running of the protected areas. This was previously the responsibility of the Directorate of Renewable Natural Resource Management within the Ministry of Agriculture. National Parks are sites of natural scenic beauty of with an important flora and fauna which are utilised for recreation, education, tourism and/or scientific research. National Monuments are regions, objects or animal or plant populations of aesthetic, scientific or historic value which are given absolute protection. Wildlife Reserves are areas set aside specifically for management of wild animal populations, and may have controlled hunting. Other definitions include Protective Zones, Forest Reserves, Wildlife Refuges and Sanctuaries, Hydrological Reserves and Virgin Region Reserves.

ADDRESS: Instituto Nacional de Parques, Direccion de Parques Nacionales, Avenida Francisco de Miranda, Parque del Este, Caracas 1062, Venezuela.

REFERENCES: Garcia A., Ing. Agr. José and Steyermark, Dr Julian (1977). Los parques nacionales de Venezuela, INCAFO, Madrid.

Gondelles, R. (1977). Los Parques Nacionales de Venezuela.

Inparques (1978). Parques Nacionales y Monumentos Naturales de Venezuela.

TOTAL AREA UNDER PROTECTION: 7,691,537 ha.

PROTECTED AREAS:

National Parks	(hectares)
1 Canaima	3,000,000
2 La Neblina	1,360,000
3 Aguaro-Guariquito	569,000
4 Jáua-Sarisarinama	330,000
5 Yapacana	320,000
6 Sierra de Perija	295,288
7 Sierra Nevada	267,200
8 Archipiélago Los Roques	225,153
9 Duida-Marahuaca	210,000
10 El Tama	139,000
11 Henri Pittier	107,800
12 Mochima	94,935

13	Guatopo	92,640
14	Medanos de Coro	91,280
15	El Avila	85,192
16	Peninsula de Paria	37,500
17	Morrocoy	32,090
18	Yurubi	23,670
19	Laguna de Tacarigua	18,400
20	Terepaima	16,971
21	El Guacharo	15,500
22	Macareo	15,000
23	Yacambu	14,800
24	Laguna de la Restinga	10,700
25	Cueva de la Quebrada del Toro	8,500
26	Cerro el Copey	7,130

Natural Monuments

1	Maria Lionza	9,690
2	Laguna de las Marites	3,674
3	Cerro Santa Ana	1,900
4	Cerros Matasiete y Guayamuri	1,672
5	Las Tetas de Maria Guevara	1,672
6	Aristides Rojas	1,630
7	Alejandro de Humboldt*	181
8	Chorrera de Las Gonzalez*	126
9	Morros de Macaira*	99
10	Cueva Alfredo Jahn*	58
11	Cerro Autana*	30
12	Laguna de Urao*	29
13	Piedra de Cocuy*	15

Faunal Refuges

1	Juan Manuel de Aguas Blancas y Aguas Negras	227,795
2	Chiriguare	44,500
3	Cuare	11,825
4	Isla de Aves	4

* These areas are not included in **TOTAL AREA UNDER PROTECTION**.

CARIBBEAN
SEA

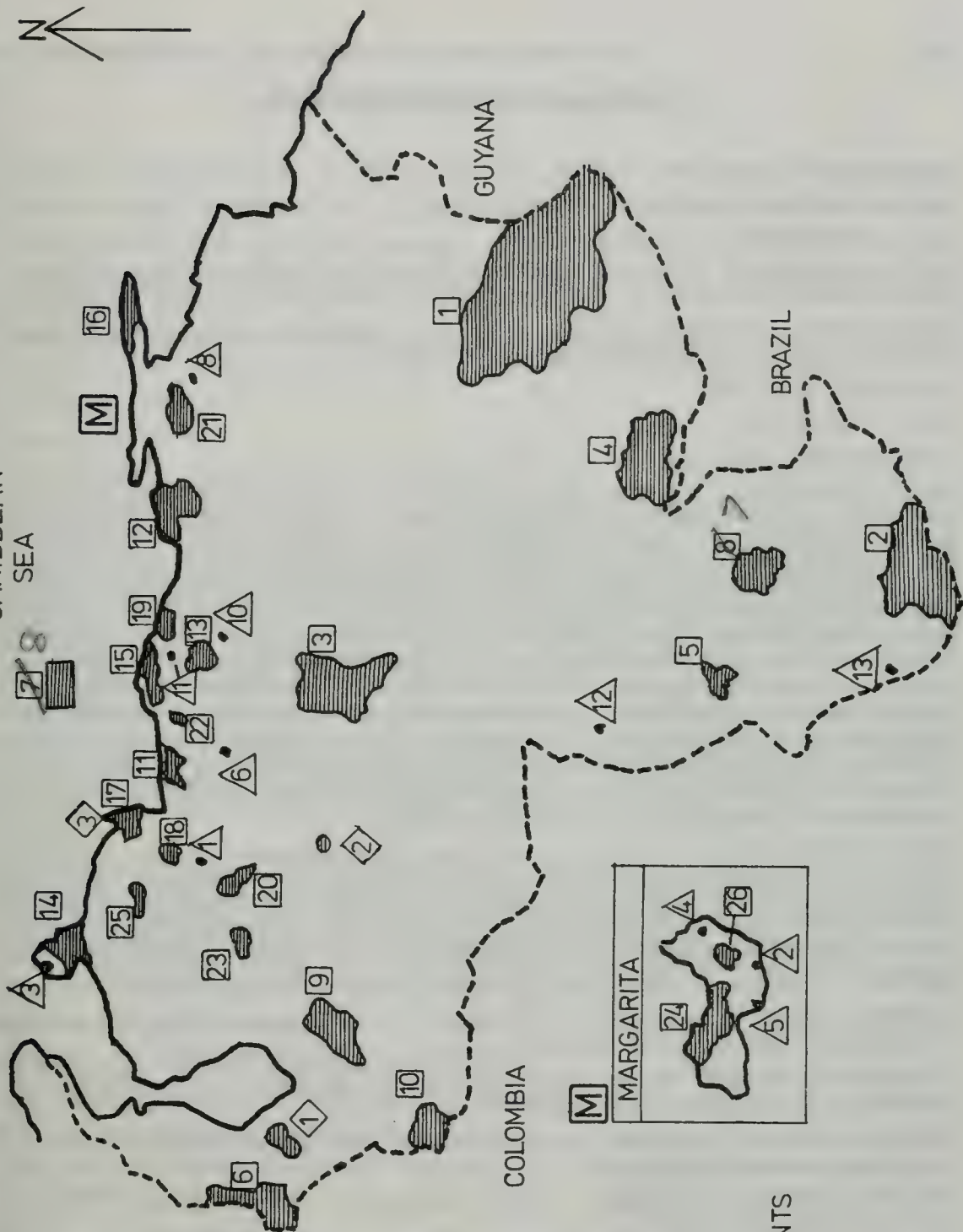
GUYANA

BRAZIL

COLOMBIA

MARGARITA

- Key.
- NATIONAL PARKS
 - △ NATURAL MONUMENTS
 - ◇ FAUNAL RESERVES



(1) Parque Nacional Canaima

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 junio 1962 por Decreto Ejecutivo No. 770. Gaceta Oficial No. 26210, 13 Junio 62. Ampliacion: Decreto No. 1.137, 9 Septiembre 67. Gaceta Oficial No. 30.809, 1 Octubre 75.

GEOGRAPHICAL LOCATION: En el Sur-Este de Escudo de Guayana; en jurisdiccion del Estado Bolivar, Distritos Piar y Roscio; 6°26'-9°39'N, 60°38'62°54'W.

ALTITUDE: 450-2,810m.

AREA: 3,000,000 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: Imponente altiplanicie con enormes mesetas de paredes verticales, conocidas con el nombre de Tepui. Esta conformada por las rocas mas antiguas de la geocronologia venezolana (1,000 millones de anos de edad); principalmente areniscas y lutitas en estratos horizontales con inyecciones de rocas igneas (diques y sills de diabasa). Las mesetas mas importantes son: Roraima (2,810m), Auyantepui, Chimantatepui y Acopantepui. En la altiplancie de la Gran Sabana el clima es templado con una temperatura media anual de 24.5°C y una precipitacion media anual de 2,578mm; en las cimas de los tepuis la temperatura puede bajar hasta casi 0°C durante la noche. El Rio Caroni, con sus numerosos afluentes, que provienen del parque es aprovechado para alimentar el Ambalse de Guri, que suministra de energia eléctrica a gran parte del pais. Ademas de las dos grandes caidas de agua (salto Angel y salto Kukenam que son la primera y la segunda mas alta del mundo) en el parque hay muchas otras.

VEGETATION: Las formaciones vegetales mas importantes son: sabanas y morichales; bosque humedo tropical, humedo premontano, muy humedo premontano, muy humedo montano bajo y pluvial montano. La vegetacion se caracteriza por presentar especies endémicas y plantas carnivoras como: *Heliamphora* sp., *Drosera roraimae* y *Utricularia humboldtii*.

NOTEWORTHY FAUNA: De la clase mamiferos, cinco especies amenazadas de extincion; estas son: oso hormiguero gigante *Myrmecophaga tridactyla* (V), armadillo gigante *Priodontes giganteus* (V), nutria gigante amazonica *Pteronura brasiliensis* (V), jaguar *Panthera onca* (V) y cuanaguaró *Felis pardalis* (V). Otros mamiferos: comadreja *Mustela frenata*, zorro cangrejero *Procyon cancrivorus*, pereza de tres dedos *Bradypus variegatus*, varias especies de monos, reptiles y ofidios. Avifauna variada; especies endémicas.

ZONING: Zonificacion especificada en el Plan Maestro; actualmente en reformulacion.

DISTURBANCES OR DEFICIENCIES: Deterioro ambiental por explotacion minera, incendios, tala de arboles, actividades agricolas de subsistencia y caceria.

SCIENTIFIC RESEARCH: Se han realizado estudios sobre: conservacion de cuencas hidrograficas, geomorfologia, geologia, suelos, vegetacion y fauna.

SPECIAL SCIENTIFIC FACILITIES: Facilidades de apoyo para investigadores en los sitios conocidos como Parupa y Laguna de Canaima.

PRINCIPAL REFERENCE MATERIAL: M.A.C. - Corpoturismo - Nat. Park Service (1974). Parque Nacional Canaima, Plan Rector.

Miller, K.R. (1963). A Proposed Plan for the Development of Canaima National Park, Venezuela, based upon National, Regional and Local Influence. Thesis, University of Washington.

STAFF: 1 Superintendent, 1 Ing. Forestal y 1 Geografo.

BUDGET: 150,466 Bs. Ano Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Administrativa: Edf. Mimu, Urb. Alta Vista Sur, Puerto Ordaz (Gerencia de Desarrollo Regional C.V.G.)

NAME OF CNPPA COORDINATOR: C. de Nlohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(2) Parque Nacional La Neblina

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978. Decreto Ejecutivo No. 2927, Gaceta Oficial No. 2417 (Ext), 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el extremo Sur del Escudo de Guayana. Dentro de la jurisdiccion del Departamento Rio Negro, Territorio Federal Amazonas: 0°37'-1°50'N, 65°12'-66°32'W.

ALTITUDE: 100-3,014m.

AREA: 1,360,000 ha.

LAND TENURE: Tierras propiedad de la Nacion.

PHYSICAL FEATURES: La Neblina es la mayor elevacion (3,014m), conocida en el continente Suramericana al Este de la Cordillera de los Andes. De la constante nuvosidad que cubre la serrania se deriva el nombre de la misma. Los estratos de roca arenisca que estricturan el macizo de la Neblina presentan plegamientos y pertenecen a la formacion Roraima (edad Precambrica); tambien forman parte de la constitucion geologica rocas igneas del Complejo Granitico de Amazonas. El relieve tiene profundos valles, entre los que se destaca el Canon Grande del Rio Bario. La temperatura depende de la altura y varia entre 8°C y 27°C. La precipitacion media anual es superior a 3,000mm. Los rios mas importantes son: Baria, Yatua y Siapa, que son afluentes del Brazo Casiquiare.

VEGETATION: Dadas las caracteristicas del relieve y el aislamiento geografico, la vegetacion es muy variada y tiene un acentuado endemismo. En los sectores bajos, bosque humedo tropical. Sobre las cimas de la montana, bosques achaparrados (*Bonnetia* sp.) y estensas alfombras de musgo *Sphagnum* sp. Plantas carnivora: *Heliamphora* sp. Numerosas especies endémica como: *Neblinaria celiae*, arbiusto que solo se conoce en el Cerro La Neblina; *Cottendorfia savannensis* (Bromeliaceae); numerosas especies de orquideas.

NOTEWORTHY FAUNA: No se ha realizado un inventario de la fauna que habita en el parque. Sin embargo, en los sectores bajos del bosque humedo tropical y los bosques en la base de la montana se sabe de la existencia de las siguientes especies: danta o tapir *Tapirus terrestris*, cunaguaro *Felis pardalis* (V), yaguar *Panthera onca* (V), varias especies de monos. Ofidios: Boa esmeralda *Corallus caninus*, anaconda *Eunectes murinus gigas*, mapanare verde *Bothrops bilineatus*. Aves: Trepador pico negro *Xiphocolaptes promeropirhynchus neblinae*, pauji nocturno *Nothocrax urumutum*.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Estudios botanicos y geologicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Brewer-Carias, C. (1978). La vegetacion del Mundo Perdido. Fund. Eugenio Mendoza.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Direccion de Parques Nacionales, Av. Franciso de Miranda, Parque del Este, Caracas 1062, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(3) Parque Nacional Aguaro-Guariquito

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.27.10 (Llanos).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 7 marzo 1974. Decreto Ejecutivo no. 1686. Gaceta Oficial No. 30349, 11 marzo 1974.

GEOGRAPHICAL LOCATION: Llanos Centrales sur del Estado Guarico, Distritos Infante y Mirande; 70°43'-8°53'N, 66°18'-59'W.

ALTITUDE: 34-220m.

AREA: 569,000 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Area representativa de los Llanos Venezolanos. El relieve es bastante uniforme y no presenta elevaciones salva pequenas terrazas adyacentes a los cursos de agua. El clima es calido y presenta dos estaciones muy marcadas: La seca de noviembre a marzo y la lluviosa de abril a octubre. La temperatura media es de 28°C, con maximas de 38°C. Las corrientes de agua que atraviesan el parque tienen su origen en rios que nacen en el Cordillera de la Costa, siendo los principales el Aguaro y el Guariquito, que es el principal colector del drenaje natural.

VEGETATION: Conformada por la sabana tropical graminiforme, en la que apraecen en forma aislada ciertas especies arboreas y formaciones boscosas mas continuas y espesas en las margenes de los rios. En los bancos-punto altos de las sabanas - la vegetacion esta compuesta por muchos tipos de gramineas como el tupuquen *Sporobolus indicus*, el gamelotillo *paspalum plicatulum*, y los géneros *Axonopus*, *Aristida*, *Eragrostis*. En los esteros y bajos se encuentran asociaciones tuipicas de plantas espinares como la barinas *Cassia aculeata*, la dormidera *Mimosa pigra*, la cachita *Raudia armata*, la espina de bagre *Hydrolea spinosa*. El moriche *Mauritia flexuosa*, palma dominante en las zonas voscosas llamadas selvas de gakeria. El morichal es una formacion tipica de los llanos de Venezuela.

NOTEWORTHY FAUNA: En las corrientes fluviales vive una gran variedad de especies acuaticas como el pavon *Cicla ocellaris*, morocoto *Colossoma macropomus*, temblador *Electrophus electricus*, bagre dormilon *Hemisorubium platyrhynchus*. Se encuentran mamiferos como el chiguire *Hydrochoerus hydrochoeris*, el mono araguato *Alouatta seniculus*, el oso hormihuero gigante *Myrmecophaga tridactyla* (V), el venado matacan *Mazama america*, el yaguar *Panthera onca* (V), el cunaguaro *Felis pardalis* (V). Rica y variada avifauna, con mas de diez especies de garzas. Entre los reptiles encontramos la iguana *Iguana iguana*, la baba *Caiman crocodilus fuscus* (V), el caiman *Crocodylus intermedius* (E), la tortuga arrau *Podocnemis expansa* (E).

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: Actividades de ganaderia y cultivo. Explotaciones petroleras.

SCIENTIFIC RESEARCH: Estudios de la fauna, especialmente sobre el chiguire, el caiman, el gavilan sabanero. Estudios de gramineas, chaparro y el moriche.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Superintendente, 1 Perito Forestal y 3 Guardaparques.

BUDGET: 380,000 Bs. Ano Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Central-Los Llanos, Parque Zoologico Las Delicias, Maracay, Estado Aragua.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(4) Jáua-Sarisarinama National Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente.

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo No. 2978. Gaceta Oficial No. 2417 (Ext), 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el Escua de Guayana, específicamente en el Sur-Oeste del Estado Bolívar, en jurisdicción del Distrito Cedenó; 4°14'-5°03'N, 64°00'-45'W.

ALTITUDE: 500-3,400m.

AREA: 330,000 ha.

LAND TENURE: Tierras propiedad de la nación.

PHYSICAL FEATURES: El relieve se caracteriza por presentar tres tepui (mesetas de Pantepui): Jáua-Jidi, la más extensa del parque; Sarisarinama-Jidi; y Guanococo-Jidi. Las rocas de estos relieves residuales son principalmente areniscas dispuestas en estratos horizontales, pertenecientes a la Formación Roraima. Las cumbres de las mesetas se caracterizan por presentar extensiones planas en algunos sectores, y en otros, superficies surcadas por profundas grietas. Sobre la Meseta de Sarisarinama se localizan las mayores simas de colapso formadas en roca arenisca, lo que constituye un fenómeno único en el mundo; la mayor de estas simas tiene 400 metros de diámetro y profundidad, Lluvias abundantes, más de 3,000mm al año; temperaturas que oscilan entre 24°C y 12°C. En Sarisarinama nacen los ríos Canaracuni, Pauo y parte del Aresi; en Jáua tienen su cuenca alta los ríos Marajano y Adawa (afluente del Caura); en Guanacoco nace el río Curumu.

VEGETATION: Bosque húmedo tropical en los terrenos bajos. Bosque achaparrado, Bosque de galería y sabanas (algunas especies vegetales: *Euterpe* sp., *Bonetia jauaensis*, *Brocchinia acuminata*, *Panicum curvifolium*); y una selva más desarrollada en el interior de las simas (Sarisarinama). Entre la flora de las mesetas se han identificado plantas nuevas y numerosas especies endémicas; de estas se pueden citar: *navia cardonae*, *Melagena jauaensis*, *Cecropia steyermarkii*, *Sloanea cavicola*, y otras que en total suman 81 especies endémicas.

NOTEWORTHY FAUNA: La fauna del parque aun no ha sido inventariada, sin embargo se puede suponer la existencia de una variada fauna relacionada con el bosque húmedo tropical. Tampoco existe un inventario completo de la fauna que habita sobre las mesetas, donde es posible que se encuentran especies zoológicas nuevas. Las investigaciones han detectado sobre las mesetas la presencia de *Letis nero* (lepidoptero) y una nueva especie de coleoptero *Deltachilum bordoni*.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES:

SCIENTIFIC RESEARCH: Investigaciones botánicas, zoológicas, geológicas y espeleológicas.

SPECIAL SCIENTIFIC FACILITIES: Ningunas.

PRINCIPAL REFERENCE MATERIAL: *Bol. Soc. Venezolana de Ciencias Naturales*, No. 132/133, Tomo XXXII. Caracas, Venezuela.

Bol. Soc. Venezolana de Espeleología Vol. 5 - No. 1.

Steyermark, J.A. y Brewer-Carias, Ch. (1976). La Vegetación de la Cima del Macizo de Jáua.

Szcerban, E. y Urbani, F. (1974). Carsos de Venezuela. Parte 4: Formas Carsicas en areniscas Precámbricas del Territorio Federal Amazonas y Estado Bolívar.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Dirección de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(5) Parque Nacional Yapacana

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978. Decreto Ejecutivo No, 2980, Gaceta Oficial No. 2417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el sector Oeste del Escudo de Guayana, Departamento Atabapo del Territorio Federal Amazonas: 3°30'-4°05'N, 66°33'-67°03'W.

ALTITUDE: 80-1345m.

AREA: 320,000 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: El Cerro Yapacana constituye un relieve residual con forma de meseta tipica del Pantepui (areniscas de la formacion Roraima). El Tepui se levanta abruptamente desde la penillanura que se extiende entre los rios Orinoco y Ventuari, donde es la mayor elevacion. Temperaturas comprendidas entre 19°C y 27°C; precipitacion media anual superior a 3,000mm. El rio Yagua es uno de los mas importantes del parque, y vierte sus aguas al rio Orinoco; otros afluentes del parque llevan sus aguas, al rio Ventuari.

VEGETATION: En la penillanura que rodea al Cerro Rapacana se extiende el bosque humedo tropical, bosque denso inundado y sabanas. En las sabanas se encuentra el género *Pentamerista*, unico representante en el mundo de la familia Tetrameristaceae conocido solamente en Malasia, donde esta representada por el género *Tetramerista*. Ademas de Centameristam se encuentran otras especies endémicas nuevas para la ciencia.

NOTEWORTHY FAUNA: No se ha realizado un inventario de la fauna silvestre que habita en el parque.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Investigaciones botanicas y geologicas.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Direccion de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1072.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(6) Parque Nacional Sierra de Perija

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Totalmente protegido..

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo No. 2983. Gaceta Oficial no. 2,417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: Cordillera de Perija, Distrito Perija y Colon del Estadi Zulia: 9°05'-10°20'N, 71°50'-72°23'W.

ALTITUDE: 80-3400 metros.

AREA: 295,288 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Su estructura esta dominada por fallas que le dan caracer abrupto. Este conjunto de bloques montañosos se elevan bruscamente sobre la depresion de Maracaibo. Clima humedo con temperaturas que oscilan aproximadamente entre los 26°C y 6.3°C, precipitaciones de mas de 2,000mm. Importante reserve hidrologica.

VEGETATION Bosques nublados y vegetacion de paramo en las partes altas de la montana. Entre las especies mas comunes podemos citar: mijao *Anacardium excelsum*, cedro amargo *Cedrela mexicana*, palma de cera *Ceroxylum* sp., yagrumo *Cecropia* sp., cucharon *Gyranthera caribensis*, araguaney *Tabebuia chrysantha*, pino aparrado *Podocarpus oleifolius*, helechos arboreos, orquideas, araceas, bromelias.

NOTEWORTHY FAUNA: Constituye un rico reservorio de fauna silvestre: el mono capuchino *Cebus nigrivittatus*, mono araguato *Alouatta seniculus*, oso melero *Tamandua tetradactyla*, cachicamo *Dasypus novemcinctus*, rata mochilera *Heteromys anomalus*, oso frontino *Tremarctos ornatus* (V), lapa *Agouti paca*, cunaguaro *Felis pardalis* (V), puerco espin *Coendu prehensilis*. Entre las aves podemos mencionar: el gaban *Mycteria americana*, rey de los zamuros *Sarcoramphus papa*, gavilan palomero *Mierastur zanothorax*, aguilá negra *Buteo albonotatus*, pauji copete de piedra *Pauxi pauxi*, alcaravan *Belonopterus cayannensis*, tucustio azul *Klais guimeti*.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: La Sierra de Perija esta habutada por pequenas comunidades de tribus de indios motilonos. El area relativamente plana, presenta problemas de ocupacion por parte de pequenos y medianos agricultores.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: 'Kasmera' Bulletin, Universidad del Zulia.

STAFF: 1 Superintendente y 1 Perito Forestal.

BUDGET: 190,879 Bs. Ano Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinacion Region Zuliana, Av. El Milagro Paseo El Lago, Maracaibo, Estado Zulia.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(8) Parque Nacional Archipiélago Los Roques

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 9 agosto 1972, Decreto Ejecutivo No. 1062. Gaceta Oficial No. 29833, 18 agosto 1972.

GEOGRAPHICAL LOCATION: Isals del Caribe Venezolana. Al norte de la Costa Central; 11°42'-12°04'N, 63°30'-67°00'W.

ALTITUDE: Nivel del mar-120m.

AREA: 225,153 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: El relieve presenta rasgos muy sobresalientes entre los que destacan la gran barrera de arrecifes, numerosas islas y cayos. Predominan una acentuada raidez interrumpida por chubascos ocasionales y por un periodo de lluvias mas intenso desde septiembre hasta enero. La media anual de temperatura es aproximadamente de 27.3°C. En ninguna de las islas y cayos hay corrientes de agua superficial, ni depositos de aguas subterranas con posibilidades de aprovechamiento.

VEGETATION: En las colinas del Gran Roque aparece una comunidad vegetal tipicamente xerofita, donde abundan las camefitas como la hierba de vidrio *Sesuvium portulacastrum*. Aparecen con frecuencia especies como el tabaco de pescador *Tournefortia gnaphalodes*. En la zona costera los tipos de plantas mas habituales son los manglares donde predominan los géneros *Rhizophora* y *Avicennia*. En los fondos marinos prospera la valiosa *Thalassia testudinum*, formando praderas donde se refugian la tortuga verde y la Carey. En los arrecifes viven en asociacion simbiotica con el coral especies del algas como la *Halimeda fabulosa* y el *Penicillus capitatus*.

NOTEWORTHY FAUNA: Solo un escaso numero de especies terrestres ha logrado adaptarse a las condiciones de este medio hostil. Entre los reptiles podemos encontrar la iguana *Iguana iguana*, el lagarto negro *Gymnodactylus lemniscatus*, el mea-mea *G. antillensis*, la salamandra *Phyllodactylus ruteni*. No existe ningun mamifero, asi como tampoco se ha constatado la presencia de ofidios. La avifauna es muy rica en especies nidificantes y migradoras; pudiendose enumerar: los pajaros bobos *Sula leucogaster*, varias especies de gaviotas, la garza pechiblanca *Egretta tricolor*, la tijereta de mar *Fregata magnificens*, la garza rojiza *E. rufescens*. De la fauna marina podemos mencionar como especies mas representativas: la cachama amarilla *Holocanthus ciliaris*, el candil *Amyris ignea*, cachicato *Haemulon sciurus*, el navajon azul *Acanthurus coeruleus*, la cachua *Basilistes vetula*.

ZONING: Existe una zonificacion preliminar en proyecto del Plan Maestro.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de pescadores que realizan actividades de subsistencia.

SCIENTIFIC RESEARCH: Estudios de geologia. Ministerio de Energia y Minas. Biologia, Fundacion La Salle de Ciencias Naturales. Ornitologia, Museo Phelps. Edafologia, Ministerio de Agricultura y Cria. Estudios sobre el zooplancton, cultivos de crustaceos, moluscos, etc., realizados por la Fundacion Cientifica Los Roques.

SPECIAL SCIENTIFIC FACILITIES: En Cayo Dos Mosquines se encuentra ubicada la Estacion Biologica de la Fundacion Cientifica Los Roques.

PRINCIPAL REFERENCE MATERIAL: Cobe de Berany, T., Edwald, J., and Cadima, E. (1972). La pesca de la Lagosta en el Archipiélago 'Los Roques'. *Informe Técnico* No. 43, Caracas.

Fundacion Cientifica Los Roques (series of reports 1-9, 1971-1973).

Phelps, W.H., and Phelps Jr., W.H. (1950). Las Aves de Las Islas Los Roques y las Aves y descripcion de un nuevo canario de mangle. *Boletin de la Soc. Venezolana de Ciencias Naturales*: 76.

Tamayo, F. (1972). El Atolon de Los Roques. Informe inédito. Caracas.

Yibirin, C., Jordan, F., Puzick, P. (1975). Parque Nacional Archipiélago Los Roques. Plan Rector. MAC.

STAFF: 1 Superintendente y 3 Guardaparques.

BUDGET: 258,093 Bs Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental, Avenida Libertador, Quinta Roca, Maturin, Estado Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(9) Parque Nacional Duida-Marahuaca

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978. Decreto Ejecutivo No. 2981. Gaceta Oficial No. 2417 (Ext), 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el Escudo de Guayana, en jurisdiccion del Departamento Atabapo, Territorio Federal Amazonas; 3°05'-50'N, 65°12'-55'W.

ALTITUDE: 250-2,580m.

AREA: 210,000 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: Los cerros Duida y Marahuaca son mesetas de paredes verticales (tepui) constituidas por estratos de roca arenisca de la Formacion Roraima (edad Precamblica). Las temperaturas varian entre 28°C en los sectores bajos a 10°C en las cimas de las mesetas. El Parque protege parte de las cuencas de los rios Iguapo, Padamo y Cunucunuma, afluentes del rio Orinoco.

VEGETATION: La vegetacion se caracteriza por su flora endémica, abundante y variada. Bosque humedo tropical y sabanas en los sectores ubicados a menor altitud. Bosques de piso templado en las bases de los tepui. Bosque achaparrados y densos sobre la cima de las mesetas. Las ultimas investigaciones botanicas arrojan un total de 167 géneros de criptogamas vascularia y fanerogamas (10 géneros nuevos): *Amphiphyllum*, *Tyleria*, *Tateanthus*, *Mycerinus*, *Chorisepalum*, *Gleasonia*, *Suidania*, *Tylerpapus*, *S. Tenopadus*, *Guidaca*; 169 especies nuevas en las paredes del Duida. Desde La Esmeralda, en el rio Orinoco, hacia la base de esta ultima meseta unas 200 especies nuevas.

NOTEWORTHY FAUNA: La fauna es muy variada, destacandose entre los mamíferos: yaguar *Panthera onca* (V), danta o tapir *Tapirus terrestris*, diversas especies de monos, etc. Aves: *Juan feo* *Nonnula rubecula duidae*, amazilia colimorada *Amazilia viridigaster duidae*, pico chato gargantiblanco *Platyrynchus mystaceus duidae* y muchas especies de la avifauna. Son abundantes los reptiles y anfibios.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Estudios sobre vegetacion, fauna y geologia.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Phelps, W.H. La Avifauna de Pantepui. *Bo. Soc. Venezolana de Ciencias Naturales*.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Direccion de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(7) Parque Nacional Sierra Nevada

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 2 mayo 1952. Por Decreto Ejecutivo No, 393. Gaceta Oficial No. 22381, 2 de mayo de 1952.

GEOGRAPHICAL LOCATION: Sistema Montanooso de Los Andes, Sierras Nevada de Mérida y de Santo Dimongo. Distritos Rangel, Lubertador y Campo Elias del Estado Mérida y Distritos Bolivar y Pedraza del Estado Barinas; 8°54'-26'N, 70°38'-71°17'W.

ALTITUDE: 600-5,007m.

AREA: 267,200 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Unica zona del pais con características alpinas y cumbres cubiertas de nieve durante todo el año. El relieve presenta pendientes abruptas, sobre todo hacia la vertiente meridena. Rocas igneas y metamorficas de gran antigüedad (edad precambrica). Posee las montañas más altas del país. El clima es tropical en los sectores bajos de la vertiente del Edo. Barinas; a medida que se asciende la temperatura es menor, hasta llegar a las cumbres más altas donde impera el clima gélido, con temperaturas por debajo de 0°C. La precipitación media anual supera los 1,000mm. Numerosas lagunas originadas por el retroceso de los glaciares. Redes hidrográficas que drenan hacia los ríos Chama y Orinoco.

VEGETATION: La gran variedad de altitudes determina la diversidad de formaciones vegetales. En los sectores bajos (vertiente de Edo. Barinas) se desarrolla el bosque húmedo tropical. Le siguen, en orden ascendentes: selva nublada; páramo cuya especie más representativa es el Frailejón *Espeletia* sp. y bosques de coloradito *Polylepis sericea*.

NOTEWORTHY FAUNA: La fauna no está distribuida uniformemente en todo el parque sino que tiende a concentrarse en la vertiente sur. El parque constituye el refugio para algunas especies que se encuentran en peligro de extinción como el oso frontino *Tremarctos ornatus* (V), puma *Felis concolor*, jaguar *Panthera onca* (V) y el condor de los Andes. En el Páramo de Mucubají habita el venado carameado *Vultur gryphus*.

ZONING: Zonificación en proyecto. Sin embargo el parque está zonificado en zonas de recreación, servicios y ambiente natural.

DISTURBANCES OR DEFICIENCIES: Ocupación por parte de campesinos dedicados a las actividades agropecuarias de subsistencia.

SCIENTIFIC RESEARCH: Investigaciones botánicas de apoyo para investigadores en el área de La Mucuy.

PRINCIPAL REFERENCE MATERIAL: Olivo, A.L. (1979). Plan Integral para el aprovechamiento, desarrollo y manejo del Parque Natural Sierra Nevada. CIDIAT-ULA-INPARQUES (Tesis).

STAFF: 1 Superintendente, 1 Biólogo, 3 Peritos Forestales y 20 Guardaparques.

BUDGET: 1,767,089 Bs, Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Coordinación Región Los Andes: Calle 19, con Avenida 4, Quinta Lourdes, Mérida-Edo, Mérida.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(10) Parque Nacional El Tama

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.34.12 (Colombian Montane).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo No. 2.984, Gaceta Oficial No. 2,417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: Sistema montañoso de Los Andes, Sierra El Tama, Distritos Junin y San Cristobal del Estado Tachiri y Distrito paez del Estado Apure; 7°05'-40'N, 72°00'-28'W.

ALTITUDE: 320-3,329m.

AREA: 139,000 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: En la Sierra La Tama el relieve se caracteriza por un conjunto de cadenas plegadas donde destacan montañas escarpadas cubiertas de bosques. Numerosos ríos y quebradas, crestas y paramos conforman el paisaje; precipitación anual de 2,000 a 4,000mm. Temperatura media de 6-12°C.

VEGETATION: Bosques húmedos compuestos por especies endémicas del país y especies andinas de Ecuador y Colombia, alcanzando allí los límites nororientales de su distribución geográfica. Vegetación de paramo.

NOTEWORTHY FAUNA: Es muy variada aun cuando no se cuenta con un estudio detallado. Incluye el casi extinto oso frontino *Tremarctos ornatus* (V), lapa *Agouti paca*, la danta *Tapirus terrestris*, cunagaro *Felis pardalis* (V). Entre las aves el colibrí inca acollarado *Coeligena torquata*, la perdiz montanera *Odontophorus columbianus*, colibrí ángel del sol *Heliangelus mavors*, cucarachero bayo *Cinnycerthia unirufa*.

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: Agricultores establecidos cuya actividad principal constituye el cultivo del café.

SCIENTIFIC RESEARCH: Se están realizando las primeras investigaciones sobre la fauna.

SPECIAL SCIENTIFIC FACILITIES: Ninungo

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Superintendent, 1 Perito Foresta.

BUDGET: 195,192 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinación Región Los Andes, Calle 19, con Avenida 4, Quinta Lourdes, Mérida, Edo. Mérida.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(11) Parque Nacional Henri Pittier

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 13 febrero 1937 por Decreto Ejecutivo s/n, Gaceta Oficial 19188, Parque Nacional Rancho Grande, 24 marzo 1953, Res. No. F-102, Parque Nacional Henri Pittier.

GEOGRAPHICAL LOCATION: Sistema montañoso del Caribe, Serranía de la Costa Central. Distritos Giradot y Marino del Estado Aragua y Guacara del Estado Carabobo; 10°14'-10°32'N, 67°24'-67°52'W.

ALTITUDE: Nivel del mar - 2,436m.

AREA: 107,800 ha.

LAND TENURE: Tierras propiedad de la nación y privada.

PHYSICAL FEATURES: Topografía montañosa abrupta y angostos valles. En la constitución geológica dominan principalmente rocas ígneas y metamórficas. La mayor altura del parque es el Pico Cenizo, situado a 2,436m. La variación del relieve influye considerablemente en el régimen de temperaturas y precipitaciones; en las mayores elevaciones, próximas a los 1,000m, las temperaturas varían entre 12°C y 24°C. Precipitaciones de 4,000mm en la zona de bosque húmedo tropical. Importante red hidrográfica.

VEGETATION: La irregular orografía en interacción con el clima determina la existencia de variadas y abundantes formaciones vegetales. Vegetación xerofita en las cercanías de la costa constituida por cardonales y espinares. Bosque arbustivo seco con árboles bajos en su mayor parte deciduos como el ajito *Capparis verrucosa*, el cuspa *Aspidosperma cuspa*, el carcanapire *Croton choristolepis*. Vegetación sabanera, cuyos árboles más notables son el yagrumo macho *Didynopanax morototone*; el matapalo *Ficus* sp., el majagua *Heliocarpus americana*. Selva nublada donde dominan el cucharón *Grynanthera caribensis*, el ramón *Trophis racemosa*, el charo macho *Ecclinusa* sp. Palmas de varias especies y un sinnúmero de helechos.

NOTEWORTHY FAUNA: Abundancia de fauna, especialmente en lo que se refiere a las aves, de las que existen aproximadamente 520 especies diferentes, las que representan el 41,6% de la avifauna del país y el 6,5% del total mundial. Son especies características: gallina cuero *Nothocercus bonapartei*, el pauji copete di piedra *Pauxi pauxi*, el campanero *Procnias querano*, el aguaitacamino *Nyctidromus albicollis*. Mamíferos: danta o tapir *Tapirus terrestris*, perrito de agua *Chironectes minimus*, puma *Felis concolor*, cunaguaro *F. pardalis* (V), lapa *Agouti paca*, venado matacán *Mazama americana*.

ZONING: Esquema preliminar de zonificación en proyecto.

DISTURBANCES OR DEFICIENCIES: Ocupación por parte de campesinos dedicados a la explotación agrícola de subsistencia. Quemas, tallas y caza furtiva.

SCIENTIFIC RESEARCH: A los estudios botánicos del Dr. Henri Pittier, hay que añadir otros de zoología, ecología, ornitología, edafología, geología, antropología, arqueología y folklore; realizados por especialistas nacionales y extranjeros.

SPECIAL SCIENTIFIC FACILITIES: La Estación Biológica de Rancho Grande dispone de instalaciones de apoyo y otras facilidades para la investigación científica.

PRINCIPAL REFERENCE MATERIAL: Ganaldon, M. et al. (1972). Plan General Maestro de Conservación y Desarrollo Turístico Recreacional. Parque Nacional Henri Pittier. Facultad de Arquitectura U.C.V. (Tesis).

Schafer, E. y Phelps, W.H. (1954). Las aves del Parque Nacional Henri Pittier (Rancho Grande) y sus funciones ecológicas. *Bolétin de la Sociedad de Ciencias Naturales* 16(83): 3-167.

STAFF: 1 Superintendente, 1 Perito Forestal y 38 Guardaparques.

BUDGET: 2,716,584 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Coordinación Región Central-Los Llanos, Parque Zoológico Las Delicias, Maracay, Estado Aragua.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(12) Parque Nacional Mochima

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 19 Diciembre 1973. Decreto Ejecutivo No. 1534, Gaceta Oficial No. 30285, 20 Diciembre 1973.

GEOGRAPHICAL LOCATION: Serrania Litoral Oriental. Distrito Sucre del Estado Sucre y Distrito Sotillo del Estado Anzoategui; 10°09'-26'N, 64°13'-47'W.

ALTITUDE: Nivel del mar - 1500m.

AREA: 94,935 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: El relieve es escarpado con valles estrechos y con fladas que caen abruptamente a la costa. Playas, golfos y ensenadas, fondos marinos y varios islotes caracterizados por tener superficies de roca. El clima en la zona costera es semi-arido tipico del litoral Venezolano; en el sector montanoso el clima es mas humedo. Las temperaturas medias anuales de Varcelona y Cumana son respectivamente de 26.5° y 26.6°C. Las precipitaciones varian de 150mm, en los isoltes, hasta 2,100mm en la Cordillera que es la divisoria de aguas del rio Neveri. La humedad media relativa es del 76%. De la red hidrografica los rios mas importantes son el Colorado (afluente del rio Neveri), y el Guaranche que forma parte de la cuenca del rio Manzanares.

VEGETATION: La franja costera contiene una flora extraordinaria, rica en especies y en comunidades vegetales. las variadas formaciones pueden incluirse en los siguientes tipos de habitats: vegetacion acuatica marina: *Thalassia testudinum*, *Ruppia maritima*, *Cymodocea manatorum* y *halodule wrightii*. Acuatica lacustre: moriche *Mauritia flexuosa*, el helecho *Acrostichum aureum*, mangle colorado *Rhizophora mangle*. Manglares: *Avicennia nitida*, *Laguncularia racemosa*, *Conocarpus erectus*. Sabanas: Celedonia *Bocconia frutescens*, alcornoque *Bowdichia virgiloides*, chaparro manteco *Byrsonima grassifolia*. Espinaries y carondales: tuna guasabara *Opuntia caribea*, cardon *Lemaireocereus deficiens*, guamacho *Peireskia guamacho*. Bosque seco: araguaney *Tabebuia chrysantha*, guatacare *Beureria puniceifolia*, cuspa *Aspidosperma cuspa*. Bosques siempreverdes: palp de vaca *Brosimum utile*, palo amarillo *Terminalia amasonia*.

NOTEWORTHY FAUNA: En las formaciones espinares y bosque seco la fauna esta representada por algunos reptiles como la iguana *Iguana iguana*, lagarto negro *Gymnodactylus lemniscatus*. Las aves marinas mas comunes son: el alcatraz *Pelecanus occidentalis*, tijereta de mar *Fregata magnificens*. Las aves comunes en la parte continental son: guacharaca *Ortalis ruficauda*, conoto *Psarcolius angustifrons*. En el bosque humedo los mamiferos que predominan son: el venado caramerudo *Odocoileus virginianus*, el armadillo gigante *Prionates giganteus* (V), el mono capuchino *Cebus nigrivittatus*, el yaguar *Panthera onca* (V). Entre los reptiles se encuentran un cierto numero de serpientes venenosas como la cascabel *Crotalus durissus cumanensis*, manapare *Bothrops atrox* y la cuaima pina *Lachesis muta muta*.

ZONING: Se ha elaborado un proyecto del Plan Maestro que contiene un esquema preliminar de zonificacion.

DISTURBANCES OR DEFICIENCIES: Pastoreo de ganado, quemas, desposicion de desechos solidos en los isoltes. Ocupacion por parte de lagunas comunidades rurales y de pescadores que realizan actividades de subsistencia.

SCIENTIFIC RESEARCH: El parque funciona como laboratorio natural para las diferentes investigaciones que realiza la Universidad de Oriente.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: INPARQUES (1980). Parque Nacional Mochima. Plan Rector.

STAFF: 1 Guardaparque.

BUDGET: 126,619 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental, Avenida Libertador, Quinta Roca, Maturin, Estado Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(13) Parque Nacional Guatopo

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 31 marzo 1958. Decreto Ejecutivo No. 122, Gaceta Oficial No. 25624.

GEOGRAPHICAL LOCATION: Sistema montañoso del Caribe. Serranía del Interior Central. Distritos Independencia, Lander y Acevedo del Estado Miranda y Distrito Monagas del Estado Guárico; 9°57'-10°14'N, 66°15'-66°43'W.

ALTITUDE: 200-1,430m.

AREA: 92,640 ha.

LAND TENURE: Tierras propiedad de la nación. El gobierno expropió las tierras, lo cual representó una inversión de Sesenta Millones de Bolívares.

PHYSICAL FEATURES: Relieve accidentado. Estructura montañosa fallada, rocas ígneas, metamórficas y sedimentarias. La cumbre más alta del parque es el Cerro Azul con 1,430m. El terreno montañoso interfiere el paso de los vientos cargados de humedad, generándose abundante nubosidad y lluvias constantes durante casi todo el año; esto permite el mantenimiento de la red de drenaje compuesta por ríos y quebradas que fluyen hacia la vertiente del mar Caribe y la del Orinoco. En las partes bajas prevalecen temperaturas altas pudiendo marcar hasta 32°C y en las proximidades de las cimas de las montañas, la temperatura es mucho más templada y puede bajar hasta los 14°C.

VEGETATION: Ambiente típico de selva tropical. En las montañas más elevadas existe la selva nublada, con abundancia de palmas, bromelias y helechos. Vegetación exuberante y variada en el bosque húmedo tropical, encontrándose entre las especies más comunes: el cedro amargo *Cedrela mexicana*, la carapa *Carapa guianensis*, el balsa *Ochroma lagopus*. Vegetación xerófila y bosques de árboles deciduos como el araguaney *Tabebuia chrysantha*, el tiamo *Acacia glomerosa*, y el indio desnudo *Bursera simaruba*.

NOTEWORTHY FAUNA: El parque conforma el hábitat para numerosas especies de la fauna silvestre, algunas en peligro de extinción como el yaguar *Panthera onca* (V) y el cunaguaró *Felis pardalis* (V). Entre las aves se pueden citar la guacharaca *Ortalis ruficauda*, la gallina azul *Tinamus tao*, especie que se creía extinta; el cristofué *Pitangus sulphuratus*, el perico carasucia *Aratinga pertinax*.

ZONING: La zonificación no está formalmente establecida; en la práctica el parque se subdivide en áreas naturales, de recreación e históricas.

DISTURBANCES OR DEFICIENCIES: Ganado vacuno, quemas y caza furtiva.

SCIENTIFIC RESEARCH: Se han realizado estudios de la flora, especialmente orquídeas y cuciorbitáceas. Estudios sobre la fauna: pequeños mamíferos y primates, batracios y reptiles. Estudios de geología.

SPECIAL SCIENTIFIC FACILITIES: Facilidades de alojamiento y transporte.

PRINCIPAL REFERENCE MATERIAL: Steyermark, J. (1962). Notas sobre de la flora del Parque Nacional Guatopo. *Boletín de La Sociedad Venezolana de Ciencias Naturales*, Caracas 23(101): 84-87.

STAFF: 1 Superintendente, 1 Perito Forestal, 24 Guardaparques.

BUDGET: 1,756,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Dirección de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(14) Parque Nacional Medanos de Coro

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 6 febrero 1974. Decreto Ejecutivo No. 1592, Gaceta Oficial No.30325, 8 febrero 1974.

GEOGRAPHICAL LOCATION: Istmo de la Peninsula de Paraguana y Planicie Costera Central del Estado Falcon, en jurisdiccion de los Distritos Miranda y Falcon; 11°23'-47'N, 69°35'-58'W.

ALTITUDE: Nivel del mar - 20m.

AREA: 91,280 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: Rasgo fisiografico unico en el pais. Presencia de dunas, medanos constituidos por la acumulacion de arenas que se desplazan bajo la accion del viento. El clima es uno de los mas calidos del Estado Falcon y la temperature media es muy uniforme durante todo el ano, oscilando entre los 27°C y 30°C, con temperaturas extremas de 40.7°C. Precipitacion media anual: 388mm.

VEGETATION: Debido a las adversas condiciones ambientales, la vegetacion es de tipo xerofilo y contiene un pequeno numero de especies. El arbor dominante de las dunas es el cuji yaque *Prosopis juliflora*, el yabo *Cercidium praecox*, el espinito *Lycium nodosum*. Las hierbas mas comunes son: el cadillo bobo *Cenchrus echinatus*, el rabo de zorro *Aristida venezuelae*, hierba de vidrio *Sesuvium portulacastrum*.

NOTEWORTHY FAUNA: A excepcion de los recursos marinos, la fauna silvestre es bastante escasa en especies. Los reptiles, lagartos e iguanas fundamentalmente son bastante comunes en estas aridas tierras. Las especies mas caracteisticas de la avifauna son: el halcon primito *Falco sparverius*, la dara *Burhinus bistriatus*, la perdiz *Colinus cristatus*, la paloma guacoa *Columba speciosa*, paloma sabanera *Zenaida auriculata*, el turpial *Icterus icterus*, el sangre de toro *Ramphocelus carbo* y el cardenal coriano *Cardinalis phoenicius*. En las zonas de mangle y en las playas son comunes diversas especies de gaviotas, playeros y garzas. Entre los mamiferos las especies mas sobresalientes son el zorro comun *Cerdocyon thous*, el conejo *Sylvilagus brasiliensis*.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de campesinos que se dedican a la cria de ganado caprino y a la pesca de especies marinas. Bote de basura.

SCIENTIFIC RESEARCH: Estudios sobre la vegetacion xerofita. Universidad Francisco de Miranda.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: 1 Superintendente y 8 Guardaparques.

BUDGET: 267,205 Bs. Ano Fiscal 1972.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinacion Region Centra-Oriental, Parque José Maria Ochoa Pile, Barquisimeto, Estado Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(15) Parque Nacional El Avila

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1958. Decreto Ejecutivo No. 473, Gaceta Oficial No. 25841.

GEOGRAPHICAL LOCATION: Sistema montañoso del Caribe, Cordon Litoral Central. Distrito Federal y Distritos Sucre, Plaza, Zamora y Acevedo del Estado Miranda; 10°27'-37'N, 66°12'-67°01'W.

ALTITUDE: 102-2,765m.

AREA: 85,192 ha.

LAND TENURE: Terrenos propiedad de la nación y privada.

PHYSICAL FEATURES: Fisográficamente el parque presenta pendientes muy pronunciadas, cursos de agua que drenan el área con inclinaciones muy fuertes y valles en forma de V. Los tipos de rocas más abundantes son las metamórficas e ígneas. Se encuentra el pico más alto de la Cordillera de la Costa; El Naiguata (2,765m). La lluvia es más abundante en la vertiente norte y en especial en la zona más alta. La temperatura varía desde los 1.5°C, en el pico Naiguata, hasta los 27°C, en los pisos altitudinales inferiores.

VEGETATION: Debido a los diferentes pisos altitudinales encontramos una serie de diferentes formaciones vegetales: bosque xerofítico, vertiente norte, siendo las especies más características el cuji negro *Acacia flexuosa*, el caramacate *Columbrina elliptica*, la tuna *Opuntia caracasana*, el cardón *Lemaireocereus deficiens*. Bosque tropofilo donde se encuentran especies como el Copey *Clusia rosea*, el jabillo *Hura crepitans*, el araguaney *Tabebuia chrysantha*, sabana de montaña: capim melao *Melinis minutiflora*, la tara amarilla *Oyedaea verbesinoides*, el hayuelo *Dodonea viscosa*, la selva nublada donde predominan el guayabo de hierro *Eugenia karsteniana*, matapalo *Ficus* sp., gran variedad de orquídeas y bromelias. Entre las especies del matorral andino se encuentran el incienso *Espletia neriifolia*, la rosa del avila *Befaria ledifolia*, la hierba de paramo *Agrostis humboldtiana*.

NOTEWORTHY FAUNA: Abundante y variada fauna. Entre los mamíferos encontramos el yaguar *Panthera onca* (V), el puma *Felis concolor*, monoaraguato *Alouatta seniculus*, la ardilla *Sciurus granatensis*, cachicamo *Dasyus novemcinctus*. Numerosas especies forman la rica avifauna: la guacharaca *Ortalis ruficauda*, la paloma turca *Leptotilla verreauxi*, cristofué *Pitangus sulphuratus* y el turpial *Icterus icterus*. Varias especies de serpientes venenosas: la cascabel *Crotalus terrificus*, la mapanare *Bothrops medusa* y la tigre mariposa *Bothrops venezuelensis*.

ZONING: La zonificación no está formalmente establecida; en la práctica el parque se subdivide en áreas naturales, de recreación e históricas.

DISTURBANCES OR DEFICIENCIES: Ocupación por parte de campesinos dedicados a la explotación agrícola. Quemaduras y botes de basura.

SCIENTIFIC RESEARCH: Estudio de la flora, alteración ecológica, población de insectos, geológicos y históricos.

SPECIAL SCIENTIFIC FACILITIES: Instalaciones para alojar a personas que se dediquen a la investigación. Cuenta con una biblioteca y un auditorio que prestan labor educativa.

PRINCIPAL REFERENCE MATERIAL: Steyermark, J. y Huber, O. (1978). La Flora del Avila.

STAFF: 1 Superintendente, 2 Peritos Forestales, 1 Técnico Superior, 1 Coordinador de combate de incendios y 21 Guardaparques.

BUDGET: 6,199,906 Bs., Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Dirección de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(16) Parque Nacional Peninsula de Paria

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo No. 9282, Gaceta Oficial No. 2417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: Serrania de Litoral Oriental, Peninsula de Paria, Distritos Arismendi, Marino y Valdez del Estado Sucre; 10°43'-50'N, 61°55'-62°27'W.

ALTITUDE: Nivel del mar - 1070m.

AREA: 37,500 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Macizo montañoso relativamente bajo con pendientes superiores a 45°; con grandes desniveles. Geomorgologicamente esta compuesto por rocas metamorficas del Cretaceo, temperatura media: 26.5°C. Precipitacion anual: 1025mm hasta 1580mm.

VEGETATION: La flora es de gran variedad y riqueza. Muchos de los arboles, arbustos, trepadoras y plantas epifitas son exclusivas de esta region. Vegetacion xerofita en las zonas mas cercanas la costa. Entre los 100 y 500 metros varia desde decidua hasta bosque siempre verde. La vegetacion de tipo bosque nublado se encuentra por encima de los 1,000 metros.

NOTEWORTHY FAUNA: Entre la avifauna se encuentran varias subespecies nuevas para la ciencia, propias del sitio: Perico pintado *Pyrrhura leucotis auricularis*, guitio canelo *Sinallaxis cinnamonea pariae*, fafao *Premnoplex tatei pariae*, hormiguero torero *Grallaria hoploneta pariae*, ponchito enano *G. nana pariae*; el parque ademas alberga una especie muy peculiar; colibri cola de tijera *Hylonympha macrocerca*. La region es rica en especies de mamiferos e invertebrados, pero aun no se han realizado inventarios faunisticos.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de campesinos en las areas de pié de monte, los cuales se dedican a labores agricolas de subsistencia.

SCIENTIFIC RESEARCH: Investigaciones botanicas.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Steyermark, J. Preservemos las Cumbres de la Peninsula de Paria. *Rev. Defensa de la Naturaleza* 2(6):33-35.

STAFF: No conocidos.

BUDGET: 10,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental, Av. Libertador, Quinta Roca, Materin, Estado Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(17) Parque Nacional Morrocoy

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 26 mayo 1974, Decreto Ejecutivo No. 113 - Gaceta Oficial No. 30.408, 27-5-74. Decreto Ejecutivo No. 944, 27-5-75. Gaceta Oficial No. 30.706, 30-5-75. Reglamento del Parque: Res. No. 69, 29-8-79. Gaceta Oficial No. 2505 E, 11-9-79.

GEOGRAPHICAL LOCATION: En la costa oriental del estado Falcon; en jurisdiccion del Distrito Silva, Estado Falcon; 10°47'-59'N, 68°09'-22'W.

ALTITUDE: Nivel del mar - 200m.

AREA: 32,090 ha.

LAND TENURE: La mayor parte de las tierras son propiedad de la nacion y una pequena extension es de propiedad privada.

PHYSICAL FEATURES: El parque tiene cuatro ambientes predominantes: El ambiente continental, donde se destaca el Cerro Chichiriviche que esta constituido por calizas arrecifales con numerosas cuevas y acantilados. El ambiente marino que enmarca los cayos con arrecifes coralinos; los manglares que encierran pequenas lagunas costeras; y las salinetas (bajios de sal) con areas pantanosas. Precipitacion media anual: 1,213mm; temperatura media anual: 26.5°C.

VEGETATION: Manglar y praderas submarinas de *Thalassia testudinum*; bosque deciduo que cubre el Cerro Chichiriviche; colonias de portulacaceas y otra vegetacion adaptada al medio salino de los cayos.

NOTEWORTHY FAUNA: Numerosas especies de avifauna : corocora roja *Eudocimus ruber*, flamenco *Phoenicopterus ruber*, tijerta de mar *Fregata magnificens* y muchas otras. Ictiofauna marina: loro *Sparisoma* sp. cachama *Pomacanthus* sp., sardina *Pellona* sp., corocoro *Haemulon* sp. y otros. Caiman de la costa *Crocodylus acutus* (E). Mamiferos que habitan el Cerro Chichiriviche, entre los que destacan: venado mataban *Mazama americana*, venado caramerudo *Odocoileus virginianus* y cunaguaro *Felis pardalis* (V).

ZONING: Zonas de: Proteccion integral, ambiente natural, recuperacion natural, recreacion y servicios.

DISTURBANCES OR DEFICIENCIES: El ambiente sufrio alteraciones antes de ser decretado Parque Nacional. Actualmente los mayores problemas son la contaminacion por desechos solidos arrastrados por la corriente litoral y depositados en las costas del quema de abroles por visitantes inescrupulosos.

SCIENTIFIC RESEARCH: Estudios de la vegetacion, georrelologia, suelos, fauna, arrecifes de coral y otros.

SPECIAL SCIENTIFIC FACILITIES: El parque dispone de apoyo para el alojamiento de científicos.

PRINCIPAL REFERENCE MATERIAL: Almeida, P. (1977). Biología y Ecología de los Arrecifes Coralinos de Tucacas Cayo Sombrero. *Bol. Soc. Venezolana de Ciencias naturales*. No. 132/133, Tomo XXXII.

MAC-Direcc. Rec. Nat. Renovables. Oficina de Parques Nacionales (1975). Parque Nacional Morrocoy, Esquema de Ordenamiento y Reglamentación.

STAFF: 1 Superintendente y 5 Guardaparques.

BUDGET: 1,530,368 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinación Región Centro-Occidental Parque José María Ochoa Pile, Barquisimeto, Edo. Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(18) Parque Nacional Yurubi

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 18 marzo 1960. Decreto Ejecutivo 235. Gaceta Oficial 26.210 (18 marzo 1960). Res. 332 (3 julio 1975). Gaceta Oficial 30441 (6 julio 1974).

GEOGRAPHICAL LOCATION: Sistema montañoso del Caribe, Serranía de Aroa. Distritos San Felipe y Bolívar, Estado Yaracuy; 10°20'-32'N, 68°39'-49'W.

ALTITUDE: 500-2,000m.

AREA: 23,670 ha.

LAND TENURE: Tierras propiedad de la nación y privada.

PHYSICAL FEATURES: Este parque forma parte de las estribaciones de la Sierra de Aroa, cuyo relieve se caracteriza por presentar filas de escarpadas montañas, así como lomas ondulantes de poca altitud. Drenan hacia los Valles de Aroa y Yaracuy gran cantidad de ríos entre los cuales se encuentran el río Yurubi, Tesorero y Carabobo. Temperaturas que oscilan entre los 26°C y 27°C con mínimas de 15°C. El promedio anual de precipitación es de 1,000mm.

VEGETATION: Selva nublada optimamente desarrollada y muy rica en especies endémicas. Entre los árboles más comunes de esta selva se pueden citar: el palo de vaca *Brosimum utile*, el pinabete *Podocarpus* sp., el marfil *Tetrorchidium rubrivenium*, el cobalonga *Sloanea fendleriana*, el copey *Clusia rosea*, el cacaón *Meliosma pittieriana*. Abundan helechos arbóreos y una gran variedad de epífitas: musgos, helechos, bromelias y orquídeas.

NOTEWORTHY FAUNA: Entre los grandes grupos zoológicos destacan por su abundancia los reptiles, en particular los ofidios, entre las que se encuentran la mapanare *Bothrops colombiensis*, la tragavenado *Boa constrictor*, la cascabel *Crotalus durissus*. Entre los mamíferos se destacan el venado matacán *Mazama americana*, el cunaguaro *Felis pardalis* (V).

ZONING: No existe zonificación.

DISTURBANCES OR DEFICIENCIES: Ocupación por parte de campesinos dedicados a actividades de agropecuaria.

SCIENTIFIC RESEARCH: Estudios de la flora y la fauna especialmente sobre ofidios.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: 1 Superintendente y 9 Guardaparques.

BUDGET: 443,257 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinación Región Centro-Occidental, Parque José María Ochoa Pile, Barquisimeto-Edo, Lara, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(19) Parque Nacional Laguna de Tacarigua

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 13 febrero 1974. Ejecutivo Decreto No. 1607. Gaceta Oficial No. 30342, 2 marzo 1974.

GEOGRAPHICAL LOCATION: En la Costa Occidental de la planicie fluvio-marina de Barlovento; dentro de la jurisdicción del Distrito Paez, Estado Miranda; 10°11'-20'N, 65°41'-65°57'W.

ALTITUDE: Nivel del mar - 10m.

AREA: 18,400 ha.

LAND TENURE: Tierras propiedad de la nación y privada.

PHYSICAL FEATURES: Laguna costera, separada del mar por una barra arenosa de 25km de extensión. Es un ambiente transicional entre el Mar Caribe y la Planicie de Barlovento; geologicamente constituido por sedimentos arenosos y arcillosos recientes. La suave pendiente de la planicie ubicada en la periferia sur del parque, determina que el drenaje sea lento dando origen a marismas y canos, así como ríos divagantes y con meandros. La laguna tiene comunicación con el mar por un canal de marea y recibe el aporte de algunas quebradas. Los ríos más importantes son el Guapo y Cupira, que no vierten sus aguas directamente a la laguna. La temperatura media anual es de 27°C y la lluvia media anual es de 1,300mm.

VEGETATION: Densas extensiones de manglar pueblan la laguna, las cuales se presentan en comunidades bien definidas y compuestas por las cuatro especies lenosa: mangle rojo *Rhizophora mangle*, mangle negro *Avicennia nitida*, mangle blanco *Laguncularia racemosa* y botoncillo *Conocarpus erectus*; la barra arenosa está cubierta de palma de coco *Cocos nucifera*, gramíneas, Portulacáceas; otras plantas adaptadas al ambiente salino. En la planicie que se extiende al sur de la laguna la vegetación dominante es el bosque seco tropical y una pequeña superficie de sabana emplazada sobre una antigua barra arenosa.

NOTEWORTHY FAUNA: Los bosques de manglar conforman el hábitat de una variada avifauna marina así mismo de numerosas especies de la ictiofauna. Entre las familias de aves que predominan se encuentran: Pelicanidae, Phalacrocoracidae, Fregatidae, Ardeidae, Threskiornithidae, Phoenicopteridae, Charadriidae, Laridae. Es muy importante destacar entre los reptiles la presencia del caimán de la costa *Crocodylus acutus* (E). Son relativamente abundantes las aves, los mamíferos e insectos en el bosque seco.

ZONING: Tiene un esquema de zonificación preliminar, sujeto a reformulación.

DISTURBANCES OR DEFICIENCIES: El régimen hidrológico natural de la laguna ha sido modificado por el hombre. Ganado pastano en el parque, tala de vegetación y caza furtiva.

SCIENTIFIC RESEARCH: Investigaciones sobre la fauna lagunar y marina. Sedimentología y geomorfología.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Chacartegui y Baldi (1978). Sedimentología de la Laguna de Tacarigua, Ministerio de Energía y Minas.

Inparques (1979). Parque Nacional Laguna de Tacarigua - Plan Rector.

STAFF: 1 Superintendente y 3 Guardaparques.

BUDGET: 278,298 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Dirección de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(20) Parque Nacional Terepaima

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 14 abril 1976, Decreto Ejecutivo No. 1519. Gaceta Oficial No. 31.000, 10 junio 1976.

GEOGRAPHICAL LOCATION: Sierra de Portuguesa, Fila de Terepaima, Distritos Palavecino e Irribarrem del Estado Lara y Distrito Araure del Estado Portuguesa; 9°46'-20°00'N, 69°11'-20'W.

ALTITUDE: 300-1,500.

AREA: 16,971 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Presenta un relieve muy accidentado. Desde el punto de vista geologico esta compuesto por rocas metamorficas. El clima es subtropical con temperaturas medias anuales que oscilan entre los 19° y 26°C. Las medias de precipitacion varian de 800mm en Cabudare hasta 2,000mm en las filas altas de la montana; las lluvias mas intensas tienen lugar durante los meses de junio y julio. Reserva natural de los recursos hidricos.

VEGETATION: Dominado por una densa selva nublada, la cual esta compuesta por especies andinas entre mezcladas con especies de la Cordillera de la Costa y por especies endemicas como el *Licania montana*, arbol desconocido en otras partes del mundo. Palmas raras como la *Hysopathe*, varias especies de helechos arborescentes. Los arboles mas comunes son: el cacao *Meliosma pittieriana*, el capurillo *Micropholis crotonoides*, el anoncillo *Rollinia fendleri*, el chaparro montanero *Byrsonima hypoleuca*, el canaflote *Cassia grandis*, el salvio *Guettarda crispiflora*. Gran humero de plantas epifitas de las familias araceas, bromeliaceas, orchidaceas, briofitas. Arbusto epifito, *Blakea schlimii*, con bellas y vistosas flores rosadas.

NOTEWORTHY FAUNA: Habitan especies amenazadas de extincion como el osos frontino *Tremarctos ornatus* (V) y el yaguar *Panthera onca* (V). Entre los mamiferos destacan el cachicamo *Dasyus novemcinctus*, el mono capuchino *Cebus nigrivittatus*, el venado matacan *Mazama americana*, el venado caramerudo *Odocoileus virginianus*, el puma *Felis conolor*, el oso melero *Tamandua tetradactyla*, la danta *Tapirus terrestris*, baquiro cinchado *Tajassu tajacu*. Entre la avifauna se encuentran: la tortolita grisacea *Columbina passerina*, el garrapatero *Crotophaga ani*, el aguaitacamino *Nyctidromus albicallus*, el cardenalito *Spinus cucuitatus*. Entre los reptiles destacan de los ofidios la cascabel *Crotalus durissus*, la tragavenado *Boa constrictor*. Entre los suarios la iguana *Iguana iguana*, y el camaleon criollo *Polychrus marmoratus*. En la fauna invertebrada podemos encontrar las mariposas Heliconidae, *Caligo* y la *Thysania agripina*, la cual es el lepidoptero mas grande del mundo.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de campesinos dedicados al cultivo de maiz, caraota, cafe y papa. Pastoreo de ganado. Talas y quemas para establacer 'conucos' de cultivos.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos

PRINCIPAL REFERENCE MATERIAL: Rodriguez, Miguel y Smith, R. (1977). El Parque Nacional Terepaima. Fundamentos de su creacion. Instituto Nacional de Parques.

STAFF: 1 Superintendente y 3 Guardaparques.

BUDGET: 312,763 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Centro-Occidental, Parque José Maria Ochoa Pile. Barquisimeto, Estado Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(21) Parque Nacional El Guacharo

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 27 de mayo 1975, Decreto Ejecutivo No. 943, Gaceta Oficial No. 30704, 28 mayo 1975.

GEOGRAPHICAL LOCATION: Sistema montanosa del Carobe. Serrania del interior oriental. Distritos Acosta y Caripe del Estado Monagas y Ribero del Estado Sucre; 10°09'-16'N, 63°31'-42'W.

ALTITUDE: 900-2,340m.

AREA: 15,500 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: El relieve esta dominado por una topografia accidentada, con fuertes declives y varios cursos de agua que dan lugar a valles estrechos y encajonados. En los sectores de mayor altitud el clima es subtropical con temperaturas frescas - durante el dia, que descienden considerablemente durante la noche. En las zonas mas bajas el clima es calido. Importantes cursos de agua permanentes como son los rios Cariaco, Caripe y Colorad y de cursos menores como la quebrada Cerro Negro, que pasa frente a la Cueva del Guacharo o Monumento Natural Alejandro de Humboldt, la cual se extiende bajo la montana.

VEGETATION: Variada vegetacion, que va desde sabanas hasta bosques humedos. Los arboles comunes en las boscosas pendientes son el guayabito *Eugenia* sp., el platanillo *Byrsonima martinicensis*, la *Gustavia augusta*, especie de la famolia Lecythidaceae, dominante en el bosque. Asociados con estos arboles existen helechos arboreos, muchas epifitas, peperonias, araceas, trepadoras, piperaceas, ericaceas, orquidaceas, helechos, siendo uno de los mas comunes el *Blechnum l'herminieri*. Los arboles comunes en el area de la cueva son la carana *Protium heptaphyllum*, la cirucle *Spondias purpurea*, el candil *Amyris ignea*.

NOTEWORTHY FAUNA: En la zona se ha constatado la existencia de especies tales como: la danta *Tapirus terrestris*, el venado caramerudo *Odocoileus gymnotis*, el vendao matacan *Mazama americana*, la lapa *Agouti paca*, el mono araguato *Alouatta seniculus*, el mono capuchino *Cebus nigrivittatus*, el yaguar *Panthera onca* (V), cunaguaro *Felis pardalis* (V) y el puma *F. concolor*. Entre las aves resalta el guacharo *Steatornis caripensis*, que es la especie mas importante de toda la region, el pauji copete de pluma *Crax daubentoni*, el pauji copete de piedra *Pauxi pauxi*, la guacharaca *Oriolus ruficauda*.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de campesinos que realizan actividades de cultivos.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Inparques, Direccion de Parques Nacionales (1980). Folleto sobre el Monumento Natural Alejandro de Humboldt, Cueva del Guacharo.

STAFF: 1 Superintendente y 3 Guardparques.

BUDGET: 528,718 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental Av. Libertado - Quinta Roca, Maturin, Estado Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(22) Parque Nacional Macareo

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 5 Diciembre 1973. Decreto Ejecutivo No, 1529, Gaceta Oficial No. 30279, 12 Diciembre 1973.

GEOGRAPHICAL LOCATION: Sistema montañoso del Caribe, Cordon Litoral Central. Departamento Libertador del Distrito Federal y Distrito Guaicaipuro del Estado Miranda; 10°20'-28'N, 67°02'-13'W.

ALTITUDE: 1,000-2,098m.

AREA: 15,000 ha.

LAND TENURE: No conocidos.

PHYSICAL FEATURES: Relieve montañosos, cuyas pendientes no son muy pronunciadas. El Alto de No Leon (2,098m) es el punto mas elevado de la cuenca. Clima fresco medida que se penetra en el parque y se hace mas templado en las zonas altas de la montaña. Abarca toda la cuenca del rio Macarao y de los rios San Pedro y Jarillo.

VEGETATION: Las formaciones vegetales estan constituidas por bosques de los tipos húmedos montano bajo, vegetacion secundaria y areas de sabana. La flora del parque es muy variada y en algunos sectores el epifitismo esta muy acentuado siendo notoria la presencia de abrotes cubiertos de musgos, bromelias, orquideas etc. Las especie arboreas consideradas auctoconas son: el cedro *Cedrela mexicana*, el bucare *Erythrina poeppigiana*, el araguaney *Tabebuia chrysantha*, el pardillo *Cordia alliodora*, el quiripiti *Clusia minor*, otra especies como *Clusia rosea* y *C. sesillis*.

NOTEWORTHY FAUNA: En los bosques de este parque habitan mamiferos como el venado matabaco *Mazama americana*, el baquiro cinchado *Dicotyles tajacu*, ej conejo de monte *Sylvilagus floridanus*, el zorro guache *Eira barbara*, el cunaguaro *Felis pardalis* (V), el monoaraguato *Alouatta seniculus*, la pereza de tres dedos *Bradypus variegatus*, el rabipelado *Didelphis marsupialis*. Entre las numerosas aves que viven en estos bosques se encuentran la pochita *Crypturellus soui*, el pauji copete de piedra *Pauxi pauxis* y la paloma gargantilla *Columba fasciata*.

ZONING: No tiene zonificación.

DISTURBANCES OR DEFICIENCIES: Sufrio alteraciones antes de ser decretado Parque Nacional. En la actualidad se encuentra totalmente saneado. Se estan realizando las obras de construccion del embalse del rio Macarao.

SCIENTIFIC RESEARCH: Estudios meteorologicos. Instituto Nacional de Obras Sanitarias. Investigaciones de la flora.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL:

STAFF: No conocidos.

BUDGET: 12,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062 D.F.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(23) Parque Nacional Yacambu

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 de junio 1962, Decreto Ejecutivo No. 771. Gaceta Oficial No. 26873, 13 junio 1962. Decreto Ejecutivo No. 1520, 14 abril 1976, Gaceta Oficial No. 30974, 5 mayo 1976.

ALTITUDE:

AREA: 14,580 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: Presenta una topografia abrupta que corresponde a las estribaciones montanosas de la Cordillera de Los Andes. Serrania de características volcanicas donde se localiza la unica fumarola existente en el país. La precipitacion media anual esta estimada en 1,886mm y se distinguen dos periodos bien definidos: lluvioso de bail a noviembre y de sequia de diciembre a marzo. La temperatura media anual es de 20.6°C. En las partes latas de la serrania se originan importantes cursos de agua tales como el rio Yacambu, que es un curso fluvial de especial valor ya que sus aguas van a ser embalsadas en una gran presa, proyecto vital para el desarrollo agricola y el abastecimiento de agua para las poblaciones cercanas.

VEGETATION: Por estar situado cerca del limite Este de los Andes de Venezuela, la flora del parque esta formada por especies andinas, entremezcladas con especies de la Cordillera de la Costa y por un sorprendente porcentaje de especies endémicas desconocidas en el resto del país. En el bosque deciduo los arboles mas comunes son el bucare, el chaperno *Machaerium acuminatum*, el araguaney *Tabebuia chrysantha*, el roble *Platymiscium diadelphum*, el palo armarillo *Terminalia amasonia*. En las sabanas se encuentran algunas bromeliaceas terrestres, hierbas. En la selva nublada abundan una gran variedad de trepadoras, plantas herbaceas, epifitas helechos y palmas de varias especies, incluyendo la prapa *Chamaedora* y *Geonoma*. Entre los arboles mas comunes encontramos el orosul *Calatola venezuelana*, el cobalonga *Sloanea fendleriana*, el canaflote *Cassia grandis*, la especie *Coupeia platycalyx* y el *Citronella paniculata*.

NOTEWORTHY FAUNA: Entre los mamiferos destacan el cachicamo *Dasyus novemcinctus*, la lapa *Agouti paca*, el picure *Dasyprocta aguti*, el mono araguato *Alouatta seniculus*, el venado matacan *Mazama americana*, el venado caramerudo *Odocoileus gymnotis*, el cunaguaro *Felis pardalis* (V), el yaguar *Panthera onca* (V), el oso melero *Tamandua tetradactyla*, la danta *Tapirus terrestris*, el baquiro cinchado *Dicotyles tajacu*. Variada avifauna: la guacharaca *Ortalis ruficauda*, el verdin montanero *Chlorophonia cyanea*, la paraulata llanera *Mimus gilvus*. Destacan de los ofidios la cascabele *Crotalus durissus*, la tragavenado *Boa constrictor*.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: Ocupacion por parte de campesinos dedicados en su mayoria al cultivo del café y a la ganaderia. Actualmente estan en ejecucion las obras de construccion de la Presa Yacambu.

SCIENTIFIC RESEARCH: Estudios geologicos. MAC 1955. Estudios Hidrologicos. MOP 1961-63. Estudios Climatologicos.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: 1 Superintendente y 5 Guardaparques.

BUDGET: 289,927 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Cetro-Occidental, Parque José Maria Ochoa Pile - Barquisimeto -Edo. Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(24) Parque Nacional Laguna de la Restinga

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 6 febrero 1974. Decreto Ejecutivo No, 1521, Gaceta Oficial No, 30.225, 8 febrero 1974.

GEOGRAPHICAL LOCATION: En la planicie costera central de la Isla de Margarita, al Norte de Venezuela. En jurisdiccion de los Distritos Peninsula de Macanao, Tubores y Diaz del Estado Nueva Esparta; 10°05'-58'N, 64°01'-17'W.

ALTITUDE: Nivel del mar - 280m.

AREA: 10,700 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Es una albufera de poca profundidad, separada del mar por una barra constituida de arena y conchas marinas. Un amplio canal de marea comunica la laguna con el mar por el Sur. Extensiones salinas bordean la laguna. Costa Occidental rocosa con acantilados y pequenas playas. El sector occidental del parque pertenece a la Peninsula de Macanao y su relieve esta conformado por colinas que alcanzan 280m. Clima arido y semi-arido. Temperature media anual 27°C; precipitacion media anual 300-400mm.

VEGETATION: En el interior de la laguna se encuentran bosques de manglar cuya extension es de 910 haa, mangle rojo *Rhizophora mangle*, mangle negro *Avicennia nitida* y mangle blanco *Laguncularia racemosa* (solo 1 ha). Sobre la barra litoral la vegetacion esta representada por mangle botoncillo *Conocarpus erectus*, yerba de grama *Sporobolus virginicus*, barilla *Batis maritima* y portulacaceas. Superficie total de manglares: 1,058 ha. Los alrededores de las salinas estan cubiertos por vegetacion xerofila que corresponde a las zonas de vida de maleza desertica tropical, monte espinoso tropical y monte espinoso premontano.

NOTEWORTHY FAUNA: 3 sub-especies endémicas: venado *Odocoileus cariacou margaritae*, conejo *Sylvilagus floridanus margaritae* y serpiente cieguita *Leptotyphlops albifrons margaritae*. Se han identificado mas de 40 especies de aves, algunas migratorias procedentes de América del Norte. Los ecosistemas de la laguna tienen una alta productividad biologica.

ZONING: Se ha elaborado un Plan Maestro que contiene el esquema de zonificacion preliminar.

DISTURBANCES OR DEFICIENCIES: Transito de vehiculos auto-motores por las marimas salinas que bordean la laguna; centenares de aves mueren todos los anos al chocar contra la linea de cables eléctricos en la barra litoral; caceria furtiva de especies endémicas (venados y conejos); tala de arboles; contaminacion microbiana de las aguas.

SCIENTIFIC RESEARCH: Inventario de manglares; inventario de aves; estudio sobre contaminacion de las aguas; sedimentologia y geomorfologia; estudios botanicos; invertebrados marinos.

SPECIAL SCIENTIFIC FACILITIES: Presenta manglares y mucha variedad de fauna.

PRINCIPAL REFERENCE MATERIAL: Scura, A. y Carpi, I. (1981). Parque Nacional Laguna de La Restinga, Plan Conceptual. Universidad Central de Venezuela - Inparques (thesis).

STAFF: 1 superintendente y 2 guardaparques para el conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita.

BUDGET: 288,533 Bs. Para el Conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinacion Region Nor-Oriental, Avenida Lobertador, Qta. Roca. Maturin, Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(25) Parque Nacional Cueva de la Quebrada del Toro

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 21 mayo 1969. Decreto Ejecutivo No. 56; Gaceta Oficial No. 28931 de fecha 28-05-60.

GEOGRAPHICAL LOCATION: En el extremo Oriental de las Serrania Churuguara - Buena Vista; en jurisdiccion del Distrito Federacion, Estado Falcon; 10°47'-51'N, 29°03'-11'W.

ALTITUDE: 400-1,120m.

AREA: 8,500 ha.

LAND TENURE: Terrenos propiedad de la nacion y privada.

PHYSICAL FEATURES: El Relieve del parque es accientado y esta conformada por espectaculares farallones de rocas calizas; la estructura geologica se encuentra fallada y fracturada, permitiendo as i que la lluvia disuelva mas facilmente las rocas calizas para formar numerosas cuevas, de las cuales la mas importante es la Cueva de la Quebrada El Toro. Dicha cueva tiene una glacia principal recorrida por uno de los rios subterraneos mas caudalosos del pais; la cueva tiene varias simas una de las cua;es tiene un desnivel de aproximadamente 108 metros (sima Elda). Extension horizontal superior a los 1,200 metros. Clima calido a subtropical. Temperatura media anual: 22°C; precipitacion media anual: 1,500mm. De la red hidrografica se pueden citar las siguientes quebradas: El Cambur, Los Riegos, Ojos de Agua y Pozo Azul, todas afluentes de la Quebrada del Toro.

VEGETATION: El 39% de la cobertura vegetal es de bosque tropofilo en estado primario; el resto de la vegetacion es bosque secundario.

NOTEWORTHY FAUNA: En la cueva habita una colonia de Guacharos *Steatornis caripensis*; tambien es notable la fauna de insectos y aracnidos. No existe un inventario de las especies animales que viven en los bosques tropofilos del parque.

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: La vegetacion sufrio alteraciones antes de ser decretado el Parque Nacional. Actualmente hay poco deterioro ambiental generado por actividades agricolas de subsistencia.

SCIENTIFIC RESEARCH: Se han realizado estudios botanico, geologicos y espeleologicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: de Bellard P., E. (1967). Las Cavernas mas importantes de Venezuela. *Bol. No. 71, de la Academia de Ciencias Fisicas, matematicas y Naturales*.

S.V.E. (1974). Cueva de la Quebrada El Toro. Catastro Espeleologico. *Bol. de la Sociedad Venezolana de Espeleologia*, Volumen 5 No. 1.

STAFF: 1 Superintendente y 5 Guardaparques.

BUDGET: 221,568 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Cetro-Occidental, Parque José Maria Ochoa Pile - Barquisimeto -Edo. Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(26) Parque Nacional Cerro El Copey

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 27 febrero 1974, Decreto Ejecutivo No. 1632, Gaceta Oficial No. 30.342, 2 marzo 1974.

GEOGRAPHICAL LOCATION: En el sector Oriental de la Islas de Margarita, al Norte de la Costa Oriental Venezolana, en jurisdiccion de los Distritos Marino, Arismendi, Gomez y Diaz del Estado Nueva Esparta; 10°57'-11°4'N, 63°51'-63°58'W.

ALTITUDE: 100-910m

AREA: 7,130 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Relieve montanoso con vertientes escarpadas; contiene la mayor elevacion de la Isla de Margarita. Rocas metamorficas e igneas. El promedio de precipitaciones varia entre 500 y 1,000mm el ano; la temperatura media anual fluctua de acuerdo a la altura: 21.5-26.4°C. El parque constituye el areas mas humeda y de mayor riqueza hidrica de la isla; las aguas provenientes del parque fluyen hacia los rios La Asuncion, Espiritu Santo y San Juan Bautista.

VEGETATION: Los bosques son en su mayoria de tipo deciduo y estan compuestos por especies de arboles y arbustos de tallo delgado. Géneros *Jatopha* y *Acacia*; gatillo *Capparis linearis*, vera *Bulnesia arborea*. Bosques humedos en los sectores ubicados a mayor altitud, con especies como copey *Clusia rosea*, abundante en este tipo de bosque, y varias especies de orquideas.

NOTEWORTHY FAUNA: 4 sub-especies de mamiferos endémicos de la Isla: mono *Cebus apella margaritae*, ardilla *Sciurus grantensis nesaeus*, venado *Odocoileus cariacou margaritae* y conejo *Sylvilagus floridanus margaritae*. Algunas aves que viven en el parque son: tucuso de montana *Trogon collaris*, reinitia montanera *Parula pitiayumi*, pavita hormiguera *Thamnophilus doliatus* y muchas otras. Una especie de reptil endémico *Anolis onca*; sapo *Bufo granulosus*, iguana *Iguana iguana*, rana de copey *Hyla rubra*.

ZONING: No esta zonificado.

DISTURBANCES OR DEFICIENCIES: Explotacion de canteras (roca caliza); contaminacion del aire por quema de desechos solidos; actividades agricolas; caza furtiva; extraccion de plantas.

SCIENTIFIC RESEARCH: Investigaciones botanicas, zoological y geologicas.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: 1 Superintendente y 2 Guardaparques para el conjunto de Parques Nacionales y Monumentos Naturales de la Isla.

BUDGET: 288,533 Bs. para el conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental, Avidena Libertador, Qta. Roca. Maturin, Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(1) Monumento Natural Maria Lionza

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 18 marzo 1960. Decreto Ejecutivo No. 234, Gaceta Oficial No. 26210, 18 marzo 1960.

GEOGRAPHICAL LOCATION: Sistema montañoso del caribe. Macizo de Nirgua. Distritos Bruzual, Urachiche y Nirgua del Estado Yaracuy; 9°50'-10°08'N, 68°39'-69°04'W.

ALTITUDE: 210-1,208m.

AREA: 9,690 ha.

LAND TENURE: Tierras propiedad de la nación y privada.

PHYSICAL FEATURES: Divisoria de aguas en cuya vertiente norte nace el río Yaracuy, que va al mar y es fuente de agua para el consumo de las poblaciones cercanas. En la vertiente sur nacen los ríos Chorro y Charay, que junto a otros ríos contribuyen al abastecimiento del embalse Las Majaguas.

VEGETATION: Selva nublada optimamente desarrollada y rica en especies, muchas de las cuales son endémicas. Entre los árboles más comunes podemos citar: el palo de vaca *Brosimum utile*, el pinabete *podocarpus* sp., el marfil *Tetrochidium rubrivenium*, el cobalong *Sloanea fendleriana*, el copey *Clusia rosea*, la carana *Protium hetaphylum*. Helechos arborescentes y una gran variedad de epifitas.

NOTEWORTHY FAUNA: Destacan por su abundancia los reptiles, en particular los ofidios como la mapanare *Bothrops colombiensis*, la tragavenado *Boa constrictor*, la cascabel *Crotalus durissus*. Abundan lagartos e iguanas *Iguana iguana*. Entre los mamíferos destacan el venado matacán *Mazama americana*, el cunaguaro *Felis pardalis* (V). Rica y variada avifauna.

ZONING: No tiene zonificación.

DISTURBANCES OR DEFICIENCIES: Disturbios causados por personas que realizan rituales mágico-religiosos. Ocupación por parte de campesinos.

SCIENTIFIC RESEARCH: No conocidos.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Superintendente y 9 Guardaparques.

BUDGET: 560,487 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Región Centro-Occidental, parque José María Ochoa Pile, Barquisimeto, Estado Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm, y P. Salinas.

INFORMATION DATED: Junio 1982.

(2) Monumento Natural Laguna de las Marites

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 27 febrero 1974, Decreto Ejecutivo No. 1633, Gaceta Oficial No. 30342, 2 marzo 1974.

GEOGRAPHICAL LOCATION: En el litoral sur de la planicie costera, Isla de Margarita. Dentro de la

jurisdiccion de los Distritos Marino y Diaz, Estado Nueva Esparta; 10°53', 10°56'N, 63°53', 63°58'W.

ALTITUDE: Nivel del mar - 40m.

AREA: 3,674 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Albfera de poca profundidad, comunicada con el mar Caribe por una boca estrecha. Se distingue el amplio espejo de aguas de 9 sq km de extension y los numerosos canales entre los manglares. Bajius de sal se extiendend entre las orillas de la laguna y el ambiente xerofilo circundante. La laguna - tiene una longitud Este-Oeste de 6km y Norte-Sur de 3.6km. Esta laguna no recibe afluentes fluviales y el suministro de agua dulce se debe a las precipitaciones. En el sector sur del Monumento afloran la formaciones. El Manglillo y Punta Mosquito, cuy composicion litologica es de rocas sedimentarias tales como areniscas, conglomerados, lutitas, coquinas y calizas (edad Eoceno-Plioceno). El clima es semi-arido, con um promedio anual de precipitaciones de 500mm y una temperatura media anual de 17.6°C.

VEGETATION: El area ocupada por manglares es de 940 ha. distribuidos principalmente en los sectores Norte y Este de la laguna. El 26% del area total ocupada por los manglares corresponde a mangle rojo *Rhizophora mangle*, 64% mangle negro *Avicennia nitida*, 0.19% mangle blanco *Laguncularia racemosa*, y 0.05% mangle votoncillo *Conocarpus erectus*. En el ambiente xerofilo son comunes plantas de los géneros *Cercidium*, *Prosopis*, *Pithecolobium*, *Caparis*, y *Opuntia*.

NOTEWORTHY FAUNA: Una poblacion reducida del caiman de la costa *Crocodylus acutus*(E), reportado para la isla de Margarita unicamente en esta laguna. Conejo *Sylvilagus floridanus margaritae* (endémico). Aves del ambiente xerofilo. Data *Burhinus bistriatus*, mochuelo de hoyo *Speotyto cunicularia*, halcon primito *Falco sparverius* y otras. Avifauna marina: cotua *Phalacrocorax olivaceus*, alcatraz *Pelecanus occidentalis*, tijereta de mar *Fregata magnificens*. Ictiofauna: corocoro *Haemulon* sp., mojarra *Eugerres plunieri*, lebranche *Mugil brasiliensis*, lamparosa *Argyreiosus vomer* y muchas otras especies. Gran variedad de invertebrados marinos.

ZONING: No esta zonificado.

DISTURBANCES OR DEFICIENCIES: Caza furtiva de caiman *Crocodylus acutus* y conejo *Sylvilagus floridanus margaritae*.

SCIENTIFIC RESEARCH: Estudios botanicos, zoological, geologicos y geomorfologicos.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: MARNR (1980). Inventario de Manglares de la Isla de Margarita. Serie de Informes Técnicos, Zonma 14, IT/3.

MARNR (1981). Inventario de Aves de la Isla de Margarita. Serie de Informes Técnicos, Zona 14.

STAFF: 1 Superintendente y 2 Guardaparques par el conjunto de Parques nacionales y Monumentos Naturales de la Isla de Margarita.

BUDGET: 288.533 Bs., par el conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental, Av. Libertador, Qta. Roca. Maturin, Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(3) Monumento Natural Cerro Santa Ana

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 14 junio 1972, Decreto Ejecutivo No. 1005, Gaceta Oficial No. 29.832, 16 junio 1972.

GEOGRAPHICAL LOCATION: En el sector Central de la Peninsula de Paraguana. En jurisdiccion de los Distrios Falcon y Carirubana del Edo. Falcon; 11°47'-50'N, 69°54'-58'W.

ALTITUDE: 50-830 m.

AREA: 1,900 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: La Peninsula de Paraguana fué una cuenca marina sumergida durante largos periodos geologicos, la cual emergio como tierra firme hace 1 millon de anos. El Cerro Santa Ana esta constituido por rocas igneo-metamorficas y sedimentarias. Desde el Este hacia el oeste se alinean los Pico Buena Vista, Santa Ana y Moruy. En los alrededores de los cerros el clima es semi-arido, pero en los sitios mas altos la humedad aumenta por la interaccion entre el clima y el relieve. Temperature media anual 25°C; precipitacion media anual 450mm.

VEGETATION: La vegetacion se sub-divide en los siguientes pisos bioticos: aona xerofitica con bosque de espinar; aona tropofitica con bosque deciduo montano; zona higrofítica mesotérmica con zona nublada; zona de matorral antillano; zona de vegetacion enana pseudoparamera.

NOTEWORTHY FAUNA: Entre las aves que habitan en el piso xerofitico se pueden citar: el cardenal coriano *Cardinalis phoenicius*, turpial *Icterus icterus* y otros. Mamiferos: algunas especies de roedores pequenos que habitan sobre los 530 metros de altitud, como raton mochilero *Heteromys anomalus* y casiragua *Echimys guianae*; en la parte baja viven: conejo de monte *Sylvilagus brasiliensis*, onza *Felis yagouarondi* (I) y cunaguaro *Felis pardalis* (V).

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: Pastoreo de ganado caprino y extraccion de lena.

SCIENTIFIC RESEARCH: Estudios zoologicos, botanicos, geologicos y arqueologicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL No conocidos.

STAFF: 1 Superintendente y 4 Guardaparques.

BUDGET: 184,938, Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Ofisinas coordinacion Region Centro-Occidental, Parque José Maria Ochoa Pile, Barquisimeto, Edo. Lara.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(4) Monumento Natural Cerros Matasiete y Guayamuri

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 27 febrero. Decreto Ejecutivo No. 1635. Gaceta Oficial No, 30342, 2 marzo 1974.

GEOGRAPHICAL LOCATION: En el sector Nor-Oriental de la Isla de Margarita. Dentro de la jurisdiccion del Distrito Arismendi, Estado Nueva Esparta; 11°02'-06'N, 63°49'-51'W.

ALTITUDE: 80-680m.

AREA: 1,672 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: El Cerro Guayamuri con una elevacion de 480 metros esta separado del Matasite (680 metros) por una depresion cuya altura maxima no pasa de 80 metros. Ambas formas de relieve estan constituidas por rocas igneas: Piroxentia, Serpentinita, Dunita y Porfido de Granito Sodico. Los dos cerros, orientados en sentido Norte-Sur, tienen laderas con pendientes relativamente suaves. Precipitacion media anual: 600mm; temperatura media anual: 27°C.

VEGETATION: Bosque muy secon tropical y bosque secon premontano. Los arboles y arbustos son de tallo delgado y en sun mayoria deciduos. En la composicion floristica se presentan los géneros *Prosopis*, *Cercidium*, *Lemaireocereus*, *Opuntia*, *Mammillaaria*.

NOTEWORTHY FAUNA: No existe un registro completo de la fauna que habita en los bosques xerofilos del Monumento, sin embargo es posible que se encuentren algunos mamiferos como el conejo *Sylvilagus floridanus margaritae* y quiropteros. La avifauna es mejor conocida; se ha registrado la presencia de: Pavita hormiguera *Thamniphilus doliatus*, oripopo *Cathartes ruficollis*, tortolita *Columbina passerina*, tordo negro margariteno *Quiscalus insularis*, gonzalito *Icterus helioeides*, y otros.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: Practicamente ningun deterioro ambiental.

SCIENTIFIC RESEARCH: Estudios de la avifauna, geologicos y geomorfologicos.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: 1 Superintendent y 2 Guardaparques, para le conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita.

BUDGET: 288,533 Bs. para le conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental: Av. Libertador, Qta. Roca. Maturin, Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(5) Monumento Natural Las Tetas de Maria Guevara

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Totalmente Protegido.

DATE ESTABLISHED: 27 febrero 1974, Decreto Ejecutivo No. 1634, Gaceta Oficial No. 30342, 2 marzo 1974..

GEOGRAPHICAL LOCATION: En el sector Sur-Oeste de la planicie costera, Isla de Margarita. En jurisdiccion del Distrito Turbores, Estado Nueva Esparta; 10°54' -58'N, 64°05' -09'W.

ALTITUDE: Nivel del mar - 130m.

AREA: 1,670 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: Cerros gemelos con una elevacion maxima de 130 metros, que se distinguen por su forma conspicua en la planicie costera de la isla. Afloramiento de esquistos anfibolicos, filitas esquistosas, marmoles. serpentinitas, metagabros, calizas y limolitas. Relieve de lomas, explayamientos y antiguos depositos de albufera (bajios de sal) alrededor de las tres lagunas costeras ubicadas dentro del Monumento (Boca de Palo, La Raya y Punta de Piedras). Clima arido y semi-arido, con una precipitacion media anual de 300mm, y temperatura media anual de 27.5°C.

VEGETATION: Cobertura vegetal de tipo xerofilo correspondiente a las zonas de vida de Maleza Desértica Tropical y Monte Espinoso Tropical. Algunas especies vegetales comunes: cuica *Cercidium praecox*, cardon *Lemaireocereus griseus*, tuna *Opuntia wentiana*, buche o melon *Melocactus caesius*, cuji yaque *Prosopis juliflora*, guamachjo *Peireksia guamacho*, dovodove *Caesalpinia coriaria*, yacure *Pithecolobium unguis-cati*. En las lagunas: mangle rojo *Rhizophora mangle*, mangle negro *Avicennia nitida* y Portulacaceae.

NOTEWORTHY FAUNA: Conejo *Sylvilagus floridanus margaritae* (sub-especie endémica). Avifauna del ambiente xerofilo: coicorita *Formicivora grisea*, pavita hormiguera *Thamnophilus doliatus*, tortolita sabanera *Columbina minuta*, cardenal *Cardinalis phoenicius*, turpial *Icterus icterus*, perico carasucia *Aratinga pertinax margaritensis* y periquito *Forpus passerinus*, caricare encrestado *Polyborus plancus*, halcon peregrino *Falco peregrinus*. Avifauna marina: cotua *Phalacrocorax olivaceus*, pico de tijera *Rynchops niger*, aguilta pescadora *Pandion aliaetus*, eijereta de mar *Fregata magnificens* y varias especies de garzas. Reptiles: coral *Micrurus isozaus*, cascabel *Crotalus durissus terrificus*, petota *Gonatodes vittatus vittatus*, lagartija *Cnemidophorus lemniscatus lemniscatus* y otros. Ictiofauna: lisa *Mugil curema*, caitipa *Diapterus rjombes*, mojarra *Eugerres plumieri*, bagre gautero *Selenapsis herzsbergii* y otros. Gran variedad de invertebrados marinos.

ZONING: No esta zonificado.

DISTURBANCES OR DEFICIENCIES: Contaminacion microbiana de las aguas en la Laguna Punta de Piedras; botadero de basura en el deposito de albufera oriental de la misma laguna; caceria de *Phoenicius cardinalis*, *Aratinga pertinax margaritensis*, *Icterus icterus*, y *Forpus passerinus* para comerciar ilegalmente.

SCIENTIFIC RESEARCH: Investigaciones botanicas, zoologicas, geologicas y geomorfologicas.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: MARNR (1980). Inventario de Manglares de la Isla de Margarita. Serie de Informes Técnicos. Zona 14, IT/3.

MARNR (1981). Inventario de Aves de la Isla de Margarita. Serie de Informes Técnicos. Zona 14.

STAFF: 1 Superintendente y 2 Guardaparques para el conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita.

BUDGET: 288.533 Bs. para el Conjunto de Parques Nacionales y Monumentos Naturales de la Isla de Margarita. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental: Av. Libertador, Qta. Roca. Maturin - Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(6) Monumento Natural Aristides Rojas

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 11 noviembre 1949, Decreto Ejecutivo No. 318, Gaceta Oficial No. 23.073, 14 noviembre 1949.

GEOGRAPHICAL LOCATION: Sistema Montanoso del Caribe, Serrania del Interior Central, en jurisdiccion del Distrito Roscio, Edo. Guarico; 9°55'-58'N, 67°22'-31'W.

ALTITUDE: 500-1,060m.

AREA: 1,630 ha.

LAND TENURE: Los terrenos son propiedad de la nacion y propiedad privada.

PHYSICAL FEATURES: Los cerros agudos, denominados localmentos 'morros' estan constituidos geologicamente por roca caliza en la que se han desarrollado numerosas cuevas. Los morros fueron arrecifes coralinos que se formaron en las aguas costeras poco profundas de un antiguo mar que cubria la zona central de Venezuela, hace aproximadamente unos 80 millones de anos. El relieve alrededor de los morros es de colinas con suave pendiente. La red drenaje es ontermitente ya que obedece al regimen de temporada seca y lluviosa. Temperatura media anual: 24°C; precipitacion media anual: 1,266mm.

VEGETATION: El tipo de vegetacion predominante es la sabana que cubre las colinas que bordean a los morros; restos de bosques deciduos en las quebradas y al pié de los morros.

NOTEWORTHY FAUNA: Mono araguato *Alouatta seniculus*, cunagaro *Felis pardalis* (V), zorro *Cerdocyon thous*, murciélago *Artibeus* sp. y fauna troglófila en la cavernas.

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: Quemas de vegetacion, caza furtiva y pastoreo.

SCIENTIFIC RESEARCH: Investigaciones geologicas y espeleologicas.

SPECIAL SCIENTIFIC FACILITIES: Ninguna.

PRINCIPAL REFERENCE MATERIAL: Urbani, F. (1973). Carsos de Venezuela. Parte 3: Zona Pedmontina de la parte Central de la Cordillera de la Costa. *Bol. Soc. Venezolana de Espeleologia* vol. 4 no. 2.

STAFF: 1 Guardaparque.

BUDGET: 98,224 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinacion Region Central-Los Llanos: Parque Zoologico Las Delicias, Maracay, Edo. Aragua.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(7) Monumento Natural Alejandro de Humboldt

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.4.1 (Guyanan).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 15 julio 1949. Decreto Ejecutivo No. 180, Gaceta Oficial No. 22970, 15 Julio 1959.

GEOGRAPHICAL LOCATION: Serrania de Interior Oriental, en la jurisdiccion del Distrito Caripe, Estado Monagas; 10°09'-11'N, 63°31'-34'W.

ALTITUDE: 1,000-1,680m.

AREA: 181 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: El relieve es montanoso y esta estructurado por le anticlinal de Periquito. La Cueva del Guacharo se ha originado en el interior de las rocas calizas que integran la formacion El Canti;. En el valle que se encuentra encima de la cueva se localizan algunas dolinas que representan formas de disolucion superficial de las rocas calizas y las cuales comunican la cueva con el ambiente exterior a través de estrechas fisuras. La entrada es amplia y comunica con un sistema de salones y gairas que tienen un desarrollo horizontal superior a 10,000 metros. la cueva esta recorrida por un rio subterraneo. La disolucion de la roca caliza ha dada lugar a la formacion de estalactitas y estalagmitas de formas y tamanos impresionantes. El area exterior recibe un promedio anual de precipitaciones de 1,178mm; temperatura media anual: 19°C. La abundancia de precipitaciones mantiene en funcionamiento la red de drenaje superficial y subterranea.

VEGETATION: El cerro de la cueva esta cubierto en su mayor parte por bosque nublado. Algunas familias vegetales que se encuentran en esta formacion son: Palmae, Lauraceae y Burseraceae, de cuyos frutos se alimento El Guacharo. Las semillas regurgitadas por los Guacharos en el interior de la cueva, germinan hasta alcanzar la etapa inicial de crecimiento, debido a la falta de luz.

NOTEWORTHY FAUNA: En el ambiente del bosque nublado habitat: yaguar *Panthera onca* (V), puma or leon americano *Felis concolor*, cachicamo *Dasyus novemcinctus*, mono araguato *Alouatta seniculus*, ardilla *Sciurus granatensis*; venado mataban *Mazama americana*, danta o tapir *Tapirus terrestris* y otros. Aves: pauji de copete *Crax daubentoni*, guachara *Ortalis ruficauda* y una gran variedad de vistosos pajaros. Entre las especies animales que viven y se reproducen en la cueva, pero que también se pueden encontrar en sitios oscuros y protegidos del ambiente exterior, se pueden citar: Guacharo *Steatornis caripensis*, rapon mochilero *Heteromys anomalus*, curareque *Proechimys guyannensis*, varias especies de quiropteros, cangrejo marron *Pseudotephusa garmani*; y numerosas especies de insectos.

ZONING: El Monumento esta zonificado en zona de uso turistico y zone de uso cientifico.

DISTURBANCES OR DEFICIENCIES: No hay deterioro ambiental.

SCIENTIFIC RESEARCH: Investigaciones biologicas, geologicas, espeleologicas y arqueologicas.

SPECIAL SCIENTIFIC FACILITIES: Alojamiento para investigadores.

PRINCIPAL REFERENCE MATERIAL: de Bellard P., E. (1960). La Cueva del Guacharo. *Bol de la Sociedad Venezolana de Ciencias Naturales* Vol. 21, no. 96.

Bruzual, A. (1975). Monumento Natural Alejandro de Humboldt. Cueva del Guacharo. MAC. Division de Parques Naturales.

Inparques (1980). Monumento Natural Alejandro de Humbolt, Cueva del Guacharo. Folleto para le visitante.

Perera, M.A. (1976). Notas sobre una excavacion en la Cueva del Guacharo. *Bol. Sociedad Venezolana de Espeleologia*, Vol. 7 no. 14.

Sociedad Venezolana de Espelologia (1974). No. 1 Cueva del Guacharo, Tomo 1.

Urbani P., F. (1971). Carsos de Venezuela, Parte 1: Serannia del Interior, Oriente de Venezuela. *Bol. de la Sociedad Venezolana de Espeleologia* vol. 3, No. 2.

STAFF: 1 Superintendente y 4 Guardaparques.

BUDGET: 10,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinacion Region Nor-Oriental: Av. Libertador, Qta. Roca Maturin - Edo. Monagas.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(8) Monumento Natural Chorrera de Las Gonzalez

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.3.1 (Colombian Coastal).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 8 mayo 1980, Decreto Ejecutivo No. 605, Gaceta Oficial No. 31980, 9 mayo 1980.

GEOGRAPHICAL LOCATION: Sierra de la Culata, Distrito Campo Elias del Estado Mérida; 8°35'N, 71°17'-18'W.

ALTITUDE: 1,650-2,400m.

AREA: 126 ha.

LAND TENURE: Tierras propiedad privada.

PHYSICAL FEATURES: Constituido por un escarpe de falla de gran belleza natural con caidas de agua. Representa por su fauna, flora y topografia un fiel exponente del paisaje Andino.

VEGETATION: Propia de la selva nublada con gran variedad de helechos, orquideas, musgos, plantas epifitas. Hacia la parte mas alta se encuentra el matorral Andino.

NOTEWORTHY FAUNA: Aves: pava Andina *Penelope montagnii*, pauji copete de piedra *Pauxi pauxi*, pauji de copete *Crax daubentoni*. Algunos mamiferos como la ardilla *Sciurus granatensis*, conejo de monte *Sylvilagus floridanus*, lapa *Agouti paca*.

ZONING: No tiene zonificacion.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficinas Coordinaciom Region Los Andes, Calle 19, con Avenida 4, Quinta Lourdes, Mérida, Estado Mérida.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: Junio 1982.

(9) Monumento Natural Morros de Macaira

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 diciembre 1978, Decreto Ejecutivo no. 2988, Gaceta Oficial No. 2417 (Ext), 7 marzo 1979.

GEOGRAPHICAL LOCATION: Sistema Montanoso del Caribe, Serrania del Interior Central dentro de la jurisdiccion del Distrito Monagas, Edo. Guarico; 9°54'N, 66°16'-17'W.

ALTITUDE: 680-927m.

AREA: 99 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: El relieve de los morros es abrupto y tiene tres cumbres principales. las rocas que constituyen los morros son calizas arrecifales de edad cretaceo inferior; numerosas cuevas y profundas simas con arroyos subterraneos que solo secan durante periodos de extreme sequia. Temperatura media anual: 23°C; lluvia media annual: 1,198mm.

VEGETATION: La cobertura vegetal esta compuesta por bosque secon y espinar.

NOTEWORTHY FAUNA: No existe un inventario sobre la fauna, que habita el Monumento; sin embargo puede suponerse la presencia de varias especies de mamiferos, aves, reptiles e insectos comunes en el bosque seco. En las cuevas viven mamiferos (quiropteros), insectos y aracnidos.

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Estudios geograficos y espeleologicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Urbani, F. (1973). Carsos de Venezuela. Parte 3: Zona Piemontina de la parte Central de la Cordillera de la Costa. *Bol. Soc. Venezolana de Espeleologia*, Vol. 4 No. 2.

STAFF: No conocidos.

BUDGET: 10,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Oficina Coordinacion Region Central-Los Llanos, Parque Zoologico Las Delicias, Maracay, Edo. Aragua.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(10) Monumento Natural Cueva Alfredo Jahn

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 diciembre 1978, Decreto Ejecutivo no. 2989, Gaceta oficial no. 2417 (Ext), 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el extremo oriental del Cordon Litoral Central de la Serrania de La

Costa. En jurisdiccion del Distrito Acevedo, Edo. Miranda; 10°28'N, 66°16'W.

ALTITUDE: 160-300m.

AREA: 58 ha.

LAND TENURE: Tierras propiedad de la nacion y privada.

PHYSICAL FEATURES: El relieve de colinas y montanas calcareas es predominante en el Monumento y sus alrededores, las cuales delimitan los valles de las quebradas Cambural y Marasmita de Birongo, que son los cursos de agua mas importantes del area. La cueva tiene 15 entradas, un desarrollo horizontal de 4,292 metros y un desnivel de 67 metros. Algunos salones de gran belleza, y galerias recorridas por un rio subterraneo. Es la segunda caverna mas larga de Venezuela. El clima es tropical humedo. Temperatura media anual 24°C; precipitacion media anual: 1969mm.

VEGETATION: La cobertura vegetal es el bosque humedo tropical.

NOTEWORTHY FAUNA: En el bosque habita una fauna diversa: mamiferos, aves, reptiles, insectos y peces. En el interior de la cueva hay una interesante fauna compuesta por mamiferos (Quiripteros), insectos, aracnidos y crustaceos.

ZONING: No conocidos.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Estudios botanicos, geologicos, espeleologicos y arqueologicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: de Bellard P., E. (1967). Las Cavernas mas importantes de Venezuela. *Bol. No. 71, A.C. Ciencias Fisicas, Matematicas y Naturales* Vol. 26.

S.V.E. (1973). Cueva Alfredo Jahn, Castrato Espeleologico. *Bol. Soc. Venezolana de Espeleologia*, Volumen 4 No. 1.

STAFF: No conocidos.

BUDGET: 10,000 Bs. Año Fiscal 1982.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Direccion de Parques Nacionales, Av. Francisco de Mirando, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(11) Monumento Natural Cerro Autana

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo no. 2987. Gaceta Oficial No. 2417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el sector, Oeste del Escudo de Guayana, Departamento Atures, Nor-Oeste del Territorio Federal Amazonas; 4°40'-50'N, 67°20'W.

ALTITUDE: 250-1,250 ha.

AREA: 30 ha.

LAND TENURE: Tierras propiedad de la nacion.

PHYSICAL FEATURES: Su estrecha y escarpada protuberancia se destaca majestuosamente desde una gran distancia. Afloramiento de areniscas cuarzosas pertenecientes a la formacion Roraima del Precambrio Inferior. Lo atraviesa de lado a lado, una cueva espectacular, a la manera del ojo de una

aguja. Es la única cueva conocida en el mundo que a pesar de sus grandes dimensiones, se encuentra formada enteramente por cuarcitas. Por un análisis geomorfológico, se deduce que el Cerro Autana ha permanecido con sus características actuales desde la era Precámbrica, es decir que la cueva también se formó en el Precámbrico. Este hecho hace que la cueva sea una de las más antiguas que se conoce. La longitud total de galerías exploradas es de 395m. Desde el punto de vista espeleológico, esta cueva se clasificaría como cueva muerta o cueva inactiva ya que no actúan en ella los procesos que la crearon. En la cueva se ha encontrado un mineral nuevo para la ciencia SVEITA. Conformar una unidad de protección que incluye parte del río Autana y el lago Leopoldo.

VEGETATION: En la cima del Cerro Autana se han encontrado varias especies nuevas para la ciencia: *Selaginella cyathea*, *Grammitis*, *Herorophtherys*, *Sloanea*, *Macrocarpaea*, *Lisianthus*. La mayor parte de la cima está cubierta principalmente por una vegetación abierta sin árboles. Esta gigantesca torre, se eleva abruptamente sobre un bosque húmedo tropical.

NOTEWORTHY FAUNA: No existe inventario faunístico.

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: Estudios geológicos, botánicos, espeleológicos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: Brewer C, CH. (1978). La vegetación del mundo perdido. *Boletín de la Sociedad Venezolana de Espeleología* 5(1): 27-54, 1974.
Boletín de la Sociedad Venezolana de Espeleología 7(13): 81-99, 1976.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Dirección de Parques Nacionales, Av. Francisco de Miranda, Parque del Este, Caracas 1062.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(13) Monumento Natural Piedra de Cocuy

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.5.1 (Amazonian).

LEGAL PROTECTION: Totalmente protegido.

DATE ESTABLISHED: 12 Diciembre 1978, Decreto Ejecutivo no. 2986. Gaceta Oficial No. 2417, 7 marzo 1979.

GEOGRAPHICAL LOCATION: En el extremo Sur-Oeste del Escudo de Guayana. A 6km de la ribera izquierda del Río Negro, cerca del punto de unión de la frontera de Venezuela, Colombia y Brasil. Departamento Río Negro, Territorio Federal Amazonas; 1°13'N, 66°48'W.

ALTITUDE: 400m.

AREA: 15 ha.

LAND TENURE: Tierras propiedad de la nación.

PHYSICAL FEATURES: Domo de exfoliación constituido por roca ígnea intrusiva (complejo granítico amazónico de edad Precámbrica). Su cima está constituida por tres picachos casi verticales. La única cara accesible es la oriental, con una pendiente media de 50°, hasta 150m, y al ascender por la superficie empinada y lisa, del porfido que constituye el peñón se divisa a lo lejos el curso del majestuoso río Negro, entre las selvas de las tres naciones ecuatoriales.

VEGETATION: En las areas cercanas al domo de exfoliacion predomina la selva humeda tropical, donde la vegetacion es muy variada y tiene un acentuado endemismo.

NOTEWORTHY FAUNA: En la selva humeda, se conocen especies tales como: la danta o tapir *Tapirus terrestris*, el cuanguaro *Felis pardalis* (V), el yaguar *Panthera onca* (V); ofidios: Boa esmeralda *Corallus caninus*, anaconda *Eunectes murinus gigas*, mapanare verde *Bothrops bilineatus*..

ZONING: No ha sido zonificado.

DISTURBANCES OR DEFICIENCIES: No conocidos.

SCIENTIFIC RESEARCH: No conocidos.

SPECIAL SCIENTIFIC FACILITIES: No conocidos.

PRINCIPAL REFERENCE MATERIAL: No conocidos.

STAFF: No conocidos.

BUDGET: No conocidos.

LOCAL PARK OR RESERVE ADMINISTRATION: Inparques, Direccion de Parques Nacionales, Av, Francisco de Miranda, Parque del Este, Caracas 1062, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm y P. Salinas.

INFORMATION DATED: Junio 1982.

(1) Juan Manuel de Aguas Blancas y Aguas Negras Fauna Reserve

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.18.4 (Venezuelan Deciduous Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 29 December 1975 by Executive Decree 1345.

GEOGRAPHICAL LOCATION: In Zulia state, southwest of Maracaibo Lake; 9°10'-9°40'N, 71°35'-72°30'W.

ALTITUDE: 0-20m.

AREA: 227,795 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: A mangrove swamp.

VEGETATION: Mangrove.

NOTEWORTHY FAUNA: Many invertebrates and important species of fish, birds, reptiles and mammals, including many threatened species.

DISTURBANCES OR DEFICIENCIES: Hunting and fishing.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: A forester based in Maracaibo city.

BUDGET: Not known.

LOCAL PARK OR RESERVE ADMINISTRATION: Division de Administracion del Ambiente, Marnr, Maracaibo.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: 1981.

(2) Chiriguare Fauna Refuge

MANAGEMENT CATEGORY: IV (Managed Nature Refuge).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 26 May 1974, Executive Decree 109.

GEOGRAPHICAL LOCATION: Central Llanos of Venezuela; 8°30'-35'N, 68°35'-55'W.

ALTITUDE: 150m.

AREA: 44,500 ha.

LAND TENURE: Privately owned; being bought by the government.

PHYSICAL FEATURES: Periodically flooding plains with permanent lagoons and rivers draining down into the Orinoco.

VEGETATION: Predominantly savanna, with palm associations and gallery forest.

NOTEWORTHY FAUNA: Many invertebrates. The vertebrate fauna includes both commercial and game fish, birds (including ibis, herons and ducks), and reptiles (including turtles, iguana, other lizards, anaconda *Eunectes murinus*, boa, viper *Bothrops* spp. and rattlesnakes *Crotalus* spp.). Mammals include foxes, anteaters, opossums, squirrels and other rodents, armadillos, sloths, monkeys, rabbits, tapirs *Tapirus* sp., and three of the cat species, the jaguar *Panthera onca* (V), puma *Felis concolor* and ocelot *F. pardalis* (V).

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Cattle breeders and hunting.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: No information.

BUDGET: No information. •

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion General de Administracion del Ambiente, Marnr. Centro Simon Bolivar, Caracas.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: 1981.

(3) Cuare Fauna Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 31 May 1972, Executive Decree 991.

GEOGRAPHICAL LOCATION: On the central northern coast of Venezuela, in Falcon state, 11°50'-12°00'N, 68°10'-20'W.

ALTITUDE: 0-100m.

AREA: 11,825 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: The park comprises a small bay surrounded by hills.

VEGETATION: Xerophytic littoral vegetation, including species of *Opuntia*, *Cereus* and *Prosopis*, some trees and mangroves.

NOTEWORTHY FAUNA: The area is a refuge of *Crocodylus acutus* (E), a species of crocodile often found in brackish waters.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: There are many roads in the refuge, which suffers from tourist pressure and some illegal hunting.

SCIENTIFIC RESEARCH: The little research that has been done in the refuge has been carried out mainly by the universities.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Some theses at the Universidad de los Andes, Merida.

STAFF: Not known - probably one guard.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion General de Administracion del Ambiente, Marnr. Centro Simon Bolivar, Caracas, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: 1981.

(4) Isla de Aves Fauna Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.17.4 (Venezuelan Dry Forest).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 23 August 1972, by Executive Decree 1069.

GEOGRAPHICAL LOCATION: An island about 400km north of the Venezuelan coast; 15°40'53"N, 63°36'27"W.

ALTITUDE: 0-10m.

AREA: 4 ha.

LAND TENURE: Government ownership.

PHYSICAL FEATURES: A small island in the Caribbean sea.

VEGETATION: Very sparse.

NOTEWORTHY FAUNA: Many commercial and game fish, and sea birds. Breeding place for giant sea turtles (E).

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None reported, but an army post has been established on the island recently.

SCIENTIFIC RESEARCH: Some studies on the breeding on turtles.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None listed.

STAFF: None, but the military presence may be of importance.

BUDGET: No information.

LOCAL PARK OR RESERVE ADMINISTRATION: Direccion General de Administracion del Ambiente, Marnr. Centro Simon Bolivar, Caracas, Venezuela.

NAME OF CNPPA COORDINATOR: C. de Blohm & P. Salinas.

INFORMATION DATED: 1981.

VIRGIN ISLANDS (UK)

AREA: 153 sq km.

POPULATION: 12,000 (1977).

PARKS AND RESERVES LEGISLATION: National Parks Trust Ordinance of 1961 allows the governor in Council to declare an area as a National Park consistent with the objectives and guidelines listed elsewhere in the Ordinance. Other relevant legislation includes the Beach Protection Ordinance (1960) and the Endangered Animals and Plants (Protection of Great Inagua) Order 1976.

PARKS AND RESERVES ADMINISTRATION: The protected areas are run by the British Virgin Islands National Parks Trust, which consists of a Chairman and other members, all appointed by the Governor in Council. The Trust is under the portfolio of the Ministry of Natural Resources and Public Health.

ADDRESS: British Virgin Islands Parks Trust, Roadtown, Tortola, British Virgin Islands.

REFERENCES: Jackson, I. (1981). A system of Marine Parks and Protected Areas for the British Virgin Islands. Unpublished report, Eastern Caribbean Natural Area Management Program. St Croix. Lazell, J.D., British Virgin Islands Faunal Survey 1980, for the Nature Conservancy.

TOTAL AREA UNDER PROTECTION: 1,483.80 ha.

PROTECTED AREAS:

Forestry Parks	(hectares)
1 Virgin Gorda Peak (Virgin Gorda)	107.24
2 Sage Mountain (Tortola)*	37.23
3 Fallen Jerusalem	12.14
4 West Dog Island	12.00
Bird Sanctuary	
1 Flamingo Pond (Anegada)	449.19
Water & Soil Conservation Park	
1 Devil's and Spring Bay	25
Marine Park	
1 Wreck of the Rhone	323

(1) Virgin Gorda Peak Forestry Park

MANAGEMENT CATEGORY: II (National Park).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 6 June 1974.

GEOGRAPHICAL LOCATION: Northwest portion of Virgin Gorda Island; 18°30'N, 64°24'W.

ALTITUDE: 100-450m.

AREA: 107 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: The area includes the upper slopes of the Virgin Gorda Peak, the highest point of the island of Virgin Gorda, and the park is of great scenic beauty.

VEGETATION: Subtropical moist forest.

NOTEWORTHY FAUNA: Include the Anegada ground snake *Dromicus portoricensis anegadae*, and the Virgin Gorda worm snake *Typhlops richardi naugus*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 17 June 1981.

(2) Sage Mountain Forestry Park

MANAGEMENT CATEGORY: VIII (Multiple Use Management Area).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964.

GEOGRAPHICAL LOCATION: About 3km west of Roadtown, Tortola; 18°24'N, 64°39'W.

ALTITUDE: 250-600 m.

AREA: 37 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Area covers the upper slopes of Sage Mountain, the highest peak on Tortola.

VEGETATION: Subtropical moist forest at the base and subtropical wet forest at the summit.

NOTEWORTHY FAUNA: Habitat for 8 endangered, threatened, or little known butterflies, 3 threatened frogs, the slipperyback *Mabuya sloanei*, iguana *Iguana iguana*, the amphisbaena *Amphisbaena*

fenestrata, the tree boa *Epicrates monensis granti*, the worm snake *Typhlops richardi richardi*, the owl *Otus nudipes newtoni* (R), and the bridled quail-dove *Geotrygon mystacea*.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Plantations of exotics.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: 1 technician.

BUDGET: About US \$5,000.

LOCAL PARK OR RESERVE ADMINISTRATION: British Virgin Islands National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney

INFORMATION DATED: 16 June 1981.

(3) Fallen Jerusalem Forestry Park

MANAGEMENT CATEGORY: I (Strict Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 6 June 1974.

GEOGRAPHICAL LOCATION: The whole of Fallen Jerusalem Island; 18°25'N, 64°27'W.

ALTITUDE: 0-50m.

AREA: 12 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: A small island scattered with huge boulders of volcanic origin.

VEGETATION: Cactus-scrub vegetation.

NOTEWORTHY FAUNA: Threatened slipperyback *Mabuya sloanei*. Nesting site for marine turtles (E).

ZONING: None at present. It has been proposed that the area be integrated into a large terrestrial and marine conservation unit.

DISTURBANCES OR DEFICIENCIES: Introduced goats, cats and rats.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 17 June 1981.

(4) West Dog Island Forestry Park

MANAGEMENT CATEGORY: IV (Managed Nature Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 6 June 1974.

GEOGRAPHICAL LOCATION: All of West Dog Island; 18°29'N, 64°27'W.

ALTITUDE: 0-50m.

AREA: 12 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: The island rises abruptly from sea and is edged in places by cliffs.

VEGETATION: Cactus-scrub.

NOTEWORTHY FAUNA: The island is particularly noted as a nesting area for bridled terns *Sterna anaethetus*.

ZONING: None, but the island is proposed for inclusion in a larger terrestrial and marine park.

DISTURBANCES OR DEFICIENCIES: No introduced species.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR : Allen D. Putney.

INFORMATION DATED: 17 June 1981.

(1) Flamingo Pond Bird Sanctuary

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1 September 1977.

GEOGRAPHICAL LOCATION: West end of Anegada Island; 18°44'N, 64°22'W.

ALTITUDE: 0-5m.

AREA: 449 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES : Salt ponds and mangroves.

VEGETATION: Mangrove forest.

NOTEWORTHY FAUNA: Previously habitat for flamingo, but few reported recently; endemic *Iguana pinguis*, and worm snake *Typhlops catapontus*. The sanctuary protects wetlands which form habitats for numbers of migratory birds.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Fishing in mangroves.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BDUGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: ~17 June 1981.

(1) Devil's and Spring Bay Water and Soil Conservation Parks

MANAGEMENT CATEGORY: V (Protected Landscape Area).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1964, with modifications in 1969.

GEOGRAPHICAL LOCATION: Two units on the south coast of Virgin Gorda Island; 18°26'N, 64°26'W.

ALTITUDE: 0-10 m.

AREA: 25 ha, comprising Devil's Bay of 23 ha and Spring Bay of 2 ha.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Scattered with huge boulders of volcanic origin; an aesthetically pleasing and picturesque landscape.

VEGETATION: Cactus scrub with scattered seagrape.

NOTEWORTHY FAUNA: None.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 17 June 1981.

(1) Wreck of the Rhone Marine Park

MANAGEMENT CATEGORY: III (National Monument).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 1980.

GEOGRAPHICAL LOCATION: Between Dead Man's Chest and Salt Islands; 18°22'N, 64°33'W.

ALTITUDE: 50 to 67m.

AREA: 323 ha with 14 ha of land and 309 ha of sea.

LAND TENURE: Government owned.

PHYSICAL FEATURES: Includes Dead Man's Chest Island and the little cays and rocks to the south, the sea bottoms and reefs east to Salt Island and the anchor and historic wreck of HMS Rhone.

VEGETATION: Cactus scrub on Dead Man's Chest Island; typical algal species of shallow tropical waters.

NOTEWORTHY FAUNA: Typical Caribbean coral reef species.

ZONING: None.

DISTURBANCES OR DEFICIENCIES: Pilferage of the Wreck of the Rhone.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: See general reference list.

STAFF: None.

BUDGET: None.

LOCAL PARK OR RESERVE ADMINISTRATION: BVI National Parks Trust.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 17 June 1981.

VIRGIN ISLANDS (USA)

AREA: 345 sq km.

POPULATION: 95,000 (1976).

PARKS AND RESERVES LEGISLATION: National Parks and other categories of lands within the National Park system are established by individual acts of Congress, except National Monuments which can be created by the President on Federal lands, by proclamation under the authority of the Antiquities Act of 8 June 1906. The National Park Service was established by the act of 25 August 1916. State Parks and Reserves are established under separate state legislation.

PARKS AND RESERVES ADMINISTRATION: Administrative and regulatory authority over the National Parks system is delegated to the National Parks Service through the Secretary of the Interior by the act of 25 August 1916 and subsequent acts of Congress (as set forth in Title 16, Code of Federal Regulation). The National Wildlife Refuges are administered by the US Fisheries and Wildlife Service, which is also responsible to the US Department of the Interior.

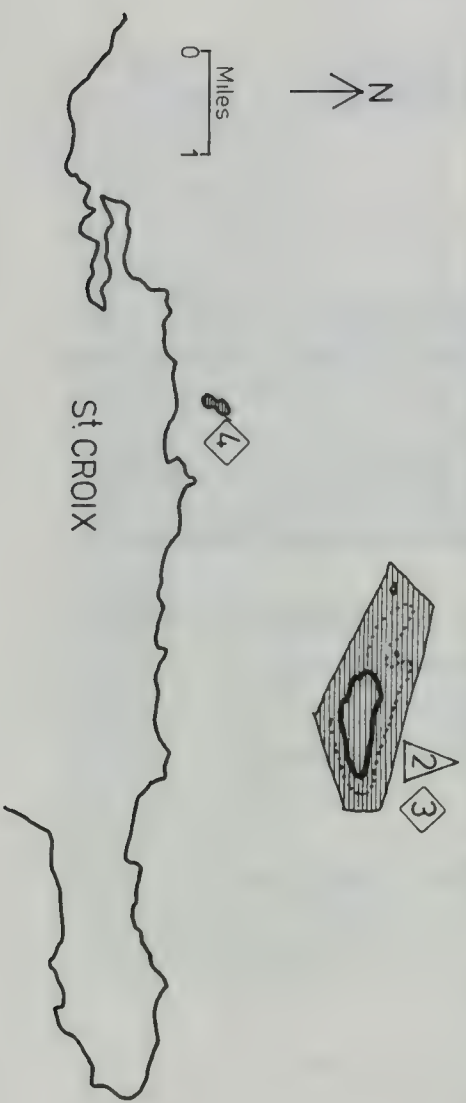
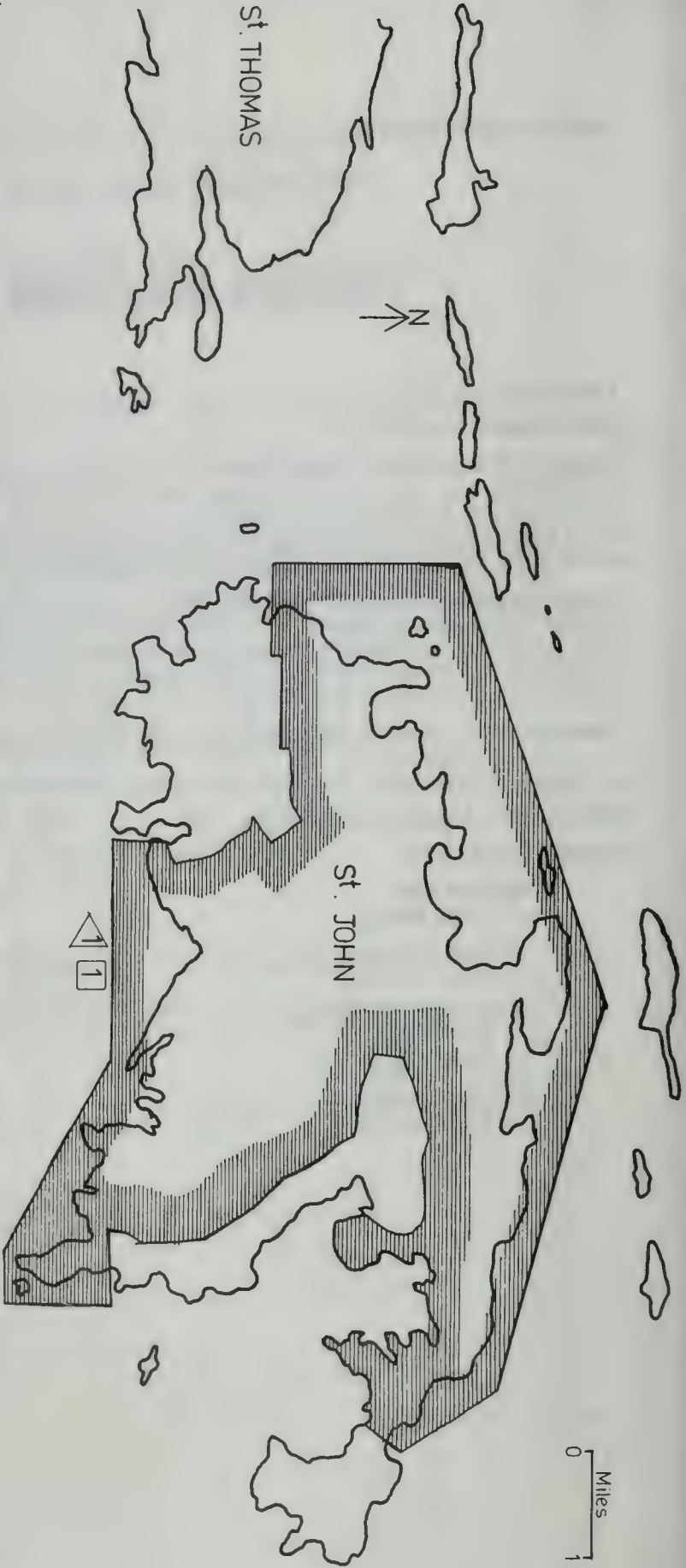
ADDRESS: (a) Director, National Park Service, US Department of the Interior, Washington DC 2040, USA.

(b) National Park Service, Red Hook, St Thomas, US Virgin Islands 00801.

TOTAL AREA UNDER PROTECTION: 6,450 ha.

PROTECTED AREAS:

National Park	(hectares)
1 Virgin Islands	6,073
National Monument	
1 Buck Island Reef	356
National Wildlife Refuges	
1 Buck Island	15
2 Green Cay	6
Biosphere Reserve	
1 Virgin Islands	(6,127)



- Key
- NATIONAL PARKS
 - △ NATIONAL MONUMENT
 - ◇ NATIONAL WILDLIFE REFUGES
 - ▽ BIOSPHERE RESERVE

(1) Virgin Islands National Park

MANAGEMENT CATEGORY: II & IX (National Park & Biosphere Reserve).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total. Concurrent jurisdiction with Virgin Islands Territorial Government on those park lands in federal ownership. Code of Federal Regulations, Title 36, Chapter 1, provides major protection including natural resources, visitor safety and control of commercial activities. The establishing legislation for the park (2 August 1956, and added to 5 October 1962) provides for the taking of certain marine animals by traditional methods to meet the food needs of the local population.

DATE ESTABLISHED: 2 August 1956 (public law 925) as a National Park; June 1976 as a Biosphere Reserve.

GEOGRAPHICAL LOCATION: On the island of St John of the US Virgin Islands, 88km east of Puerto Rico; 18°21'N, 64°44'W.

ALTITUDE: 0-389m.

AREA: Park: 3,644 ha land; 2,429 ha sea. Biosphere Reserve: 6127 ha.

LAND TENURE: 4953 ha are currently owned by the park. 1174 ha are in private ownership (about 20 ha by the Territorial Government. When land acquisition is complete, about 77% of the island will be park.

PHYSICAL FEATURES: The park occupies about two thirds of the island and surrounding waters of St John, the smallest of the three major US islands. On St John and St Thomas islands the earliest volcanic deposits of the northwest Caribbean lava flows are visible in many places. Steep, verdant hillsides rise from rocky shores which are interspersed with coral sand beaches, numerous bays and cays. Clear, warm waters, fringing coral reefs, canyons of coral ledges, coral gardens, turtle grass beds, mangrove swamps, natural salt ponds. Climatic conditions vary from the drier, windward (eastern) exposures to the moist mountain top. Temperatures remain fairly constant around 26°C, and rainfall averages about 1000mm per year.

VEGETATION: Forest and brush cover 70-85% of St John Island. After 250 years of intensive agriculture on St John's flatlands and much of the steep slopes, 200 years of selective cutting associated with charcoal making, and the introduction of many exotics, vegetation barely resembles the natural forest. It varies from cactus and other arid land types to mahogany, bay, genip and palms. A subtropical moist forest grows at the higher elevations in protected valleys. The lower elevations, southern and eastern slopes and less exposed coastal sites are primarily subtropical, dry forests. Along the southern and eastern shore, the trade winds and direct exposure to the sun have created a xerophytic vegetation. There is little grassland left where cattle and horses roamed in the grazing era that followed the sugarcane and cotton agriculture.

NOTEWORTHY FAUNA: A variety of colourful tropical fish and invertebrates inhabit fringing coral reefs around St John. Threatened sea turtles nest on beaches within park boundaries, and the mangrove swamp ecosystem supports breeding populations of many marine animals and birds, including the locally threatened white-crowned pigeon *Columba leucocephala*, the brown pelican *Pelecanus occidentalis*, booby *Sula leucogaster*, man-o-war bird *Fregata magnificens*, Bahamian pintail *Anas bahamensis*, Zenaida dove *Zenaida aurita*, mustached quail dove *Geotrygon mystaceae*. Reptiles include the anoles lizards *Anolis* spp. The amphibians are limited to frogs, and the only native mammals are several species of bats. Among the latter is the red fig-eating bat *Stenoderma rufum*, a rare species. Exotic and feral mammals include murine rodents, ungulates, and the destructive mongoose *Herpestes auropunctatus*. Resident reptiles (lizards, plus a few snakes) and resident and migratory birds conclude the list of vertebrates. A still little-known invertebrate fauna, mostly as insects, is present.

ZONING: Park lands are classified into four general zones - natural, historic, development, and special use. Environmental protection zone (Trunk Bay) - 1%; outstanding natural features zone (coral reefs and park waters) - 5%; natural environment zone (land area) - 85%; historic zone (ruins) - 2%; development zone (developed areas) - 5%; special use zone (transport) - 2%.

DISTURBANCES OR DEFICIENCIES: Centuries of intensive plantation agriculture stripped the island of St John of its original vegetation. Ruins of these plantations remain and are part of the park's attractions. Gradual regrowth has brought back some forest, permanently altered by the absence of some native species and the presence of exotics. Road cuts and residential development are also present within the authorized park boundaries. Exotic burros and mongoose are present. Private development of real

estate within the park's boundary is causing abnormal erosion of soil and detracts from the scenic landscape. The marine environment around St John has remained relatively undisturbed, but there is some visitor impact on the reefs of Trunk Bay, poaching of turtle eggs, coral collecting and boats anchoring on reefs.

SCIENTIFIC RESEARCH: This relatively undisturbed tropical island provides excellent conditions for research and much has been carried out including some environmental monitoring and ecological research. The 'Tektite' underwater programme has been the largest effort.

SPECIAL SCIENTIFIC FACILITIES: Virgin Islands Ecological Research Station (Caribbean Research Institute of the College of the Virgin Islands).

PRINCIPAL REFERENCE MATERIAL: Britton, N.L. *et al.* (1919-1952). Scientific Survey of Puerto Rico and the Virgin Islands. New York Academy of Science. 19 vols.

Connelly, T.W. (1966). Geology of St Thomas and St John, US Virgin Islands. Geological Society of America Memoirs 98: 85-176.

Little, E.L. Jr. and Wadsworth, F.H. (1964). Common trees of Puerto Rico and the Virgin Islands. Agriculture Handbook No. 249, USDA.

Randall, J.E. (1963). An analysis of the fish populations of artificial and natural reefs in the Virgin Islands. *Carib. Journal of Science* 3(1): 31-47.

US National Park Service (1977). Statement for Management - Virgin Islands National Park.

A series of reports on marine life and habitats around St John is available. The park maintains a small reference library.

STAFF: 34 full-time; 25 seasonal (1981). These employees carry out the maintenance, protection, interpretation, and administrative functions of the park.

BUDGET: US\$ 985,000 (1979).

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Virgin Islands NP, PO Box 806, Charlotte Amalie, St Thomas, Virgin Islands 00801, USA.

NAME OF CNPPA COORDINATOR: Allen D. Putney-R. Milne.

INFORMATION DATED: 30 March 1981.

(1) Buck Island Reef

MANAGEMENT CATEGORY: III (Natural Monument).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 28 December 1961 (proclamation no. 3443) and 1 February 1975 (proclamation no. 4346).

GEOGRAPHICAL LOCATION: 6km northeast of Christiansted, St Croix; 17°45'N, 64°45'W.

ALTITUDE: 0-100m.

AREA: 71 ha (terrestrial); 285 ha marine.

LAND TENURE: 100% federally owned.

PHYSICAL FEATURES: Buck Island is a small cay located only 2km off the northeastern shore of St Croix. Its major feature is a magnificent barrier reef surrounding the eastern half of the island. The reef is 12m high in places along its outer perimeter. The enclosed lagoon reaches 100 yards in width with an average depth of 3m. Historic ruins of the 1700s are located along the ridgeline of the island and shell mounds and pottery shards indicate aboriginal use of the area. Beaches are found on the southern and western shorelines.

VEGETATION: Vegetation of the island is basically xerophytic, dominated by cactus. Trees such as

acacia *Acacia tortuosa*, tan tan *Leucaena latisquama*, tamarind *Tamarindus indica* and turpentine *Bursera simaruba* are also prominent.

NOTEWORTHY FAUNA: Endangered hawksbill *Eretmochelys imbricata* (E), leatherback *Dermochelys coriacea* (E) and green turtle *Chelonia mydas* (E) nesting sites. This is one of the few remaining Caribbean nesting sites for the brown pelican *Pelecanus occidentalis*. There is abundant marine life associated with the reef, including gorgonians, sea whips, sea fans, spiny sea urchins, jellyfish, moray eels and many fish such as the foureye butterflyfish *Chaetodon capistratus*, smooth trunkfish *Lactophrys triqueter*, porkfish *Anisotremus virginicus*, French angelfish *Pomacanthus paru*, queen angelfish *Holacanthus ciliaris* and blue angelfish. Larger fish include sharks, snappers and barracudas.

ZONING: Natural environment zone (15 ha sea, 2 ha land); environmental protection zone (50 ha sea, 62 ha land); outstanding natural zone (220 ha sea, 7 ha land).

DISTURBANCES OR DEFICIENCIES: Introduced rats and mongoose which prey on the native fauna. In the past the island was extensively grazed by goats, but these have now been eliminated. The original forest was felled and repeatedly burned over to provide pasture, but vegetation has now regenerated. There is some destruction of reefs by boat anchors and pollution caused by cleaning of boats.

SCIENTIFIC RESEARCH: Study of the impact of tourism on reef and lagoon.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: March 18, 1977. Statement for Management - Buck Island Reef National Monument. US National Park Service.

STAFF: 6 full-time staff.

BUDGET: US \$55,000 for operating expenses.

LOCAL PARK OR RESERVE ADMINISTRATION: Superintendent, Buck Island, Fort Christiansvaern, PO Box 160, Christiansted, St Croix.

NAME OF CNPPA COORDINATOR: Allen D. Putney.

INFORMATION DATED: 9 March 1979.

(1) Buck Island National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: January 1969.

GEOGRAPHICAL LOCATION: Approximately 2 miles south of St Thomas, US Virgin Islands; 64°53'N, 18°16'W.

ALTITUDE: 0-19.5m.

AREA: 14.6 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: A small rocky island with three beaches.

VEGETATION: Dry, subtropical forest. Cactus *Opuntia* spp., *Cereus* spp. and beach grasses *Panicum maximum* abound. Other shrubs, vines and a few trees are present.

NOTEWORTHY FAUNA: Mangrove cuckoo *Coccyzus minor*, pearly-eyed thrasher *Margarops fuscatus*, migratory warblers, doves and brown pelicans *Pelecanus occidentalis* are present.

ZONING: Rural, agricultural.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: None.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: None.

STAFF: Administered from Cabo Rojo NWR.

BUDGET: Funded under Cabo Rojo NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, PO Box 510, Boqueron, Puerto Rico 00622.

INFORMATION DATED: January 1981.

(2) Green Cay National Wildlife Refuge

MANAGEMENT CATEGORY: IV (Wildlife Sanctuary).

BIOGEOGRAPHICAL PROVINCE: 8.41.13 (Lesser Antillean).

LEGAL PROTECTION: Total.

DATE ESTABLISHED: 15 December 1977.

GEOGRAPHICAL LOCATION: 0.4 miles off the north coast of St Croix, US Virgin Islands; 64°40'N, 17°46'W.

ALTITUDE: Sea level to 19m.

AREA: 5.7 ha.

LAND TENURE: Federal government ownership.

PHYSICAL FEATURES: A small rocky island with adjacent coral reefs and grassbeds. There is an Indian midden dating to 1000 AD.

VEGETATION: Dry, subtropical forest densely vegetated with grasses, cacti and low-lying shrubs. *Croton discolor* and *Acacia tortuosa* are common.

NOTEWORTHY FAUNA: American oystercatcher *Haematopus palliatus* and the federally endangered brown pelican *Pelecanus occidentalis* nest on Green Cay. The federally endangered St Croix ground lizard *Ameiva polyps* is protected here on some of its last remaining habitat.

ZONING: Rural and agricultural.

DISTURBANCES OR DEFICIENCIES: None.

SCIENTIFIC RESEARCH: A population study of the St Croix ground lizard and a plant study are currently being undertaken.

SPECIAL SCIENTIFIC FACILITIES: None.

PRINCIPAL REFERENCE MATERIAL: Philobosian and Ruibal. Conservation of the Lizard '*Ameiva polyps*'. *Herpetological* 27: 450-454.

Philobosian and Yntema. Records and Status of some Reptiles and Amphibians in the Virgin Islands. *Herpetological* 34: 47-51.

Reference material available from refuge headquarters and/or West Indies Laboratory, St Croix, US Virgin Islands.

STAFF: Two permanent full-time employees assisted by two youth programmes (five year-round and 12 summer employees). Administered from Cabo Rojo NWR.

BUDGET: Administered from Cabo Rojo NWR.

LOCAL PARK OR RESERVE ADMINISTRATION: Refuge Manager, PO Box 510, Boqueron, Puerto Rico 00622.

INFORMATION DATED: 29 January 1981.

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